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THREATENED and ENDANGERED PLANTS of ALASKA

by David F. Murray

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Drawings by
Ann C. Schell

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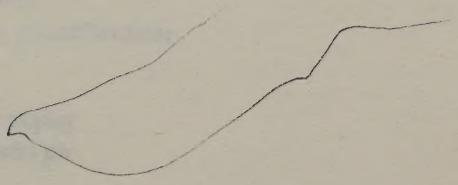


CONTENTS

INTRODUCTION iv
PART 1. ENDANGERED TAXA
Artemisia aleutica 1
Cryptantha shackletteana 3
Eriogonum flavum var. *aquilinum* 6
Mertensia drummondii 8
Oxytropis kobukensis 10
Polystichum aleuticum 12
Salix ovalifolia var. *glacialis* 14
Smelowskia pyriformis 17
PART 2. THREATENED TAXA
Artemisia senjavinensis 19
Aster yukonensis 21
Carex jacobi-peteri 23
Erigeron muirii 25
Erysimum asperum var. *angustatum* 28
Montia bostockii 31
Oxytropis kokrinensis 33
Papaver alboroseum 35
Papaver walpolei 37
Podistera yukonensis 39
Smelowskia borealis var. *villosa* 41
Taraxacum carneocoloratum 43
Thlaspi arcticum 45
PART 3. RARE TAXA WITH UNDETERMINED STATUS
Artemisia unalaskensis var. *aleutica* 47
Calamagrostis crassiglumis 47
Carex plectocarpa 48
Castilleja annua 48
Erigeron hultenii 48
Juncus slwookoorum 48
Oxytropis arctica var. *barnebyana* 49
Oxytropis glaberrima 49
Poa eyerdamii 49
Poa laxiflora 49
Poa merrilliana 50
Poa norbergii 50
Puccinellia triflora 50
Rhinanthus arcticus 50
Saxifraga aleutica 51

PART 4. TAXA WITHDRAWN FROM CONSIDERATION
Cerastium aleuticum 52
Draba ruaxes 52
Gentianella propinqua ssp. *aleutica* 52
Gymnocarpium heterosporum 52
Lesquerella arctica var. *scammanae* 53
Ranunculus occidentalis ssp. *nelsonii* 53
LITERATURE CITED 54
APPENDIX 55
GLOSSARY 57
INDEX 59

INTRODUCTION

The Endangered Species Act of 1973, with amendments of 1978, provides some protection for plants and animals from needless extinction by acts of man. To a great extent, the law was developed to prevent losses through commercial exploitation, which for some taxa is a major concern. Consequently, the law controls, by permit, interstate and international transfers of listed species. It also prohibits any Federal agency from conducting or supporting activities that might lead to the extinction of plants and animals. It is because of this provision that there is in Alaska a great deal of interest in the Act.

With so much of the State administered by Federal agencies and with accelerated development, much of which is under Federal sponsorship, compliance with the Act has required a review of the rare plants in the State, with special attention to those that might be considered threatened or endangered. This manual is an attempt to make results of this initial review available to agency personnel and to the general public sharing our concern for the protection of rare plants.

This manual will be of greatest use to those with at least a modest background in botany or the willingness to develop one. It is designed as a field reference with the assumption that a familiarization with the relevant plant groups will be obtained by using one of the more comprehensive treatments available, e.g. Hulten (1968) and Welsh (1974). In these, descriptions of each taxon can be found; therefore, they are not repeated here. I have provided a diagnosis for each taxon to emphasize those characteristics that are useful in the field to distinguish the plant in question from its close morphological relatives. When a diagnosis alone is insufficient, a dichotomous key is included. In addition, the splendid illustrations by Ann Schell highlight basic features of each plant.

Habitats are described when they are known, but our knowledge of some rare species is based solely on a few herbarium specimens, and the ecological notes on specimen labels are brief and can be ambiguous. The distribution of each taxon is generalized in the text, and a map is included on which all localities are included, although a single dot can represent one or several neighboring sites.

When the specific habitat can be described in detail, this knowledge can be used to predict where else the plant might be found. This allows us to narrow the field of view when searching for new records, but we cannot make the assumption that the plant, in all cases, will be found there. First, our perception of the precise environmental controls is likely to be imperfect, and we may mistakenly attribute significance to a particular habitat type. Second, plants do not occupy all the places that are suitable for them. Therefore, field checks are required to test our predictions. Nevertheless, even with the meager habitat and geographic data at hand, we can make educated guesses.

The critical habitats are usually not in the common widespread types, but in more specialized settings, often different from the surrounding terrain. Many of the plants treated in this manual show affinities for dry bluffs, flood plains, river terraces, sand dunes, rocky slopes, outcrops, fellfields, and mountain summits. These settings are also the sources for ballast and fill required by construction projects, and in the Far North on ice-rich soils, the volumes used can be enormous. The implications should be obvious.

Common names are given only when one has already been used by Hultén (1968) or Welsh (1974). A common or vernacular name can be useful and is worth maintaining only if it is indeed in common use and applied to one type of plant. I do not share the view that consistency should be obtained by mechanically manufacturing "common names," particularly for very uncommon taxa. This is a pointless exercise that could divert attention from the fact that the bibliographic record to taxa is tied to the scientific name. The plant names used by me, when two or more choices are available, indicate taxonomic decisions, but ones that in no way affect the taxon being named. Synonyms are included in these instances to facilitate cross-referencing to work by others. For some taxa, doubts have been expressed that they deserve to be treated as distinct rather than as forms falling within the variation of a more common species. When such questions exist, a brief statement of the problem is included.

Whether a taxon is endangered or threatened can be only subjectively determined, and therefore, the proposals made here are subject to debate and modification. Some plants are truly rare, but in Alaska there is always the great risk that the rareness is an artifact of our current ignorance. The plants may be inconspicuous and overlooked or obvious enough, but restricted to areas poorly known because they are remote and unexplored.

Endangered status requires that extirpation of a taxon is possible throughout all or a significant portion of its total range. Implicit is the sense of imminence; survival is in jeopardy because of current or planned activities. Also, plants occurring in a very limited area or in a restricted, specialized habitat have been considered *de facto* endangered (cf. Ayensu and DeFilipps 1978), and that interpretation is used here too. The eight taxa proposed for endangered status are known: from one locality, although perhaps locally common there *(Mertensia drummondii* and *Oxytropis kobukensis)*, from two sites not very distant from each other *(Artemisia aleutica, Cryptantha shackletteana, Eriogonum flavum* var. *aquilinum, Polystichum aleuticum, Smelowskia pyriformis)*, or from more sites but subject to impact from development *(Salix ovalifolia* var. *glacialis)*.

A threatened taxon is one so restricted in its distribution as likely to become endangered, the vulnerable category of the IUCN Red Data Book. Included here are taxa known from as few as two or three localities, but these are distant from each other, and the belief is that more will be found elsewhere *(Aster yukonensis, Carex jacobi-peteri, Smelowskia borealis* var. *villosa)*. Others on the threatened list are known from several localities, but are not

widespread.

Among other rare plants in Alaska are those for which a status cannot be determined and those rare in the State but common elsewhere. This manual addresses only those taxa proposed as endangered and threatened, as well as several that are so little understood that their status is undetermined. The manual is divided into four sections. The first treats taxa proposed for endangered status and the second those considered threatened. The third section consists of abstracts that state briefly the problems associated with several taxa that have been singled out by others for special status, but which are little known. Morphological and taxonomic circumscription of these would be tenuous and possibly misleading, therefore these are considered of undetermined status. The fourth section sets forth briefly the rationale for dropping some taxa from consideration. The taxa are arranged alphabetically within each section, but an appendix lists them systematically by family. Literature cited, an index, and a glossary are also provided.

Alan Batten, Margaret Evans, Barbara Murray, and Leslie Viereck reviewed the manuscript and provided helpful criticism and comment.

All but three of the drawings are based on specimens at the Herbarium of the University of Alaska Museum. The one of *Artemisia aleutica* is taken from a photograph and those of *Carex jacobi-peteri* and *Polystichum aleuticum* were copied from drawings by Dagny Tande Lid, for which permission was given.

I hope this manual will be amended periodically to accommodate both additions to and subtractions from the lists. It is very important, therefore, that information on the distribution of these taxa and candidates for additions be sent to me. Comments and corrections are solicited

David F. Murray
Institute of Arctic Biology
and University Museum
University of Alaska, Fairbanks

PART 1. ENDANGERED TAXA

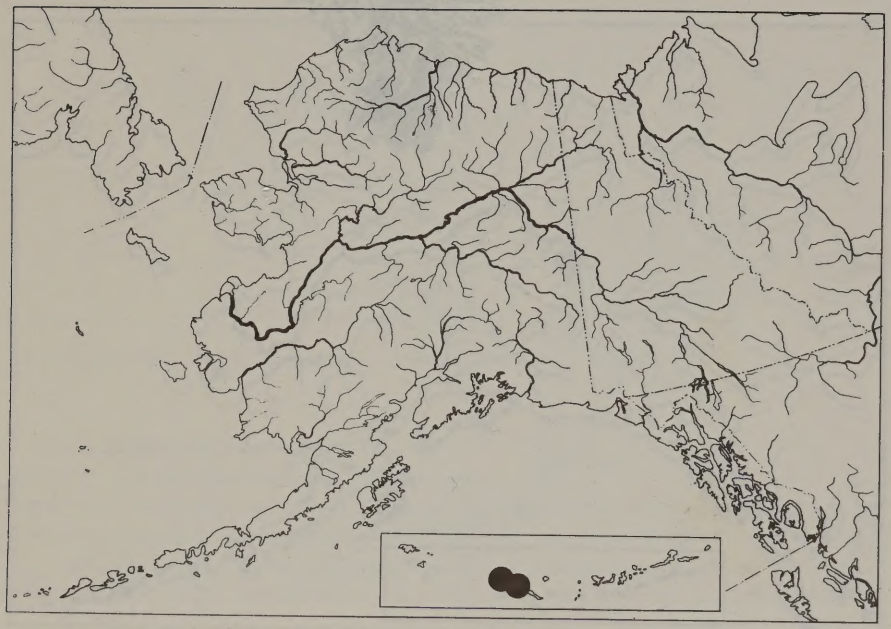
ARTEMISIA ALEUTICA Hulten Aleutian wormwood

This sage or wormwood is striking for its low growth and simple, few-flowered inflorescence.

The little we know of this species is derived from three collections made on Kiska Island and one from Rat Island of the Aleutian Islands. Its habitat, according to Hultén (1968), is stony slopes.

This species is in the complex of taxa that includes *Artemisia borealis* Pallas and *A. furcata* Bieberstein.

Endangered status is proposed, but fieldwork to examine the taxon *in situ* is essential to make an accurate assessment of its status.



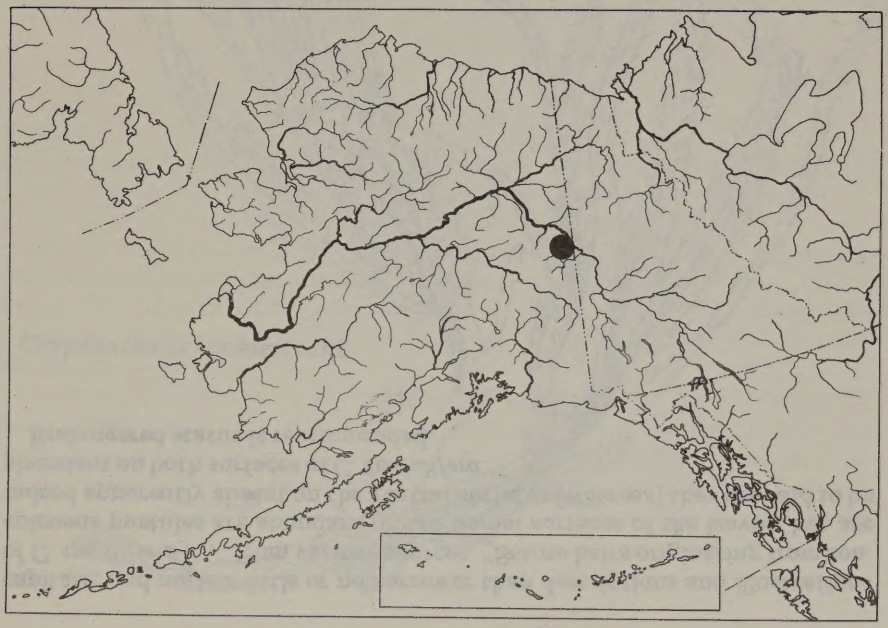
Artemisia aleutica
The bar scale on all drawings indicates 10mm.

CRYPTANTHA SHACKLETTEANA L. C. Higgins

The genus *Cryptantha* is widespread and consists of many taxa in temperate regions, but in Alaska this endemic species is our sole representative. One of the borages, *Cryptantha* shares with the more common genera here *(Amsinckia, Eritrichum, Lappula, Mertensia,* and *Myosotis)* hypogynous flowers with united corollas and four-lobed ovaries which at maturity form four nutlets. Characteristic of *Cryptantha shackletteana* are its small white flowers subtended by leafy bracts, nutlets without prickles or teeth, and calyces that enlarge greatly at maturity.

This species is known only from two localities in the upper Yukon River region of Alaska, in the vicinity of Eagle, where it is found on steep, dry, unstable south-facing rubble slopes at low elevations and at the margins of sparsely vegetated grasslands (Batten et al. 1979).

This species has been considered taxonomically close to the more common *C. spiculifera* (Payson) Piper [*C. interrupta* (Green) Payson] which reaches the Pacific Northwest of the contiguous states, but differs from it, according to Higgins (1969), by having "longer and narrower leaves with only inconspicuous pustulate hairs, the more capitate inflorescence, longer and narrower nutlets with less evident markings, and weaker stems." On the other hand, Batten et al. (1979) found that additional specimens now at hand "appear to have leaves no longer or narrower, inflorescences no more



capitate, and nutlets little or no narrower than descriptions and illustrations of *C. spiculifera* . . ." from various sources. "Setose hairs originating from conspicuous pustules are abundant on the dorsal surfaces of the leaves, but are indeed apparently absent on the ventral surfaces [whereas] they are said to be abundant on both surfaces of *C. spiculifera*."

Endangered status is recommended.

Cryptantha schackletteana

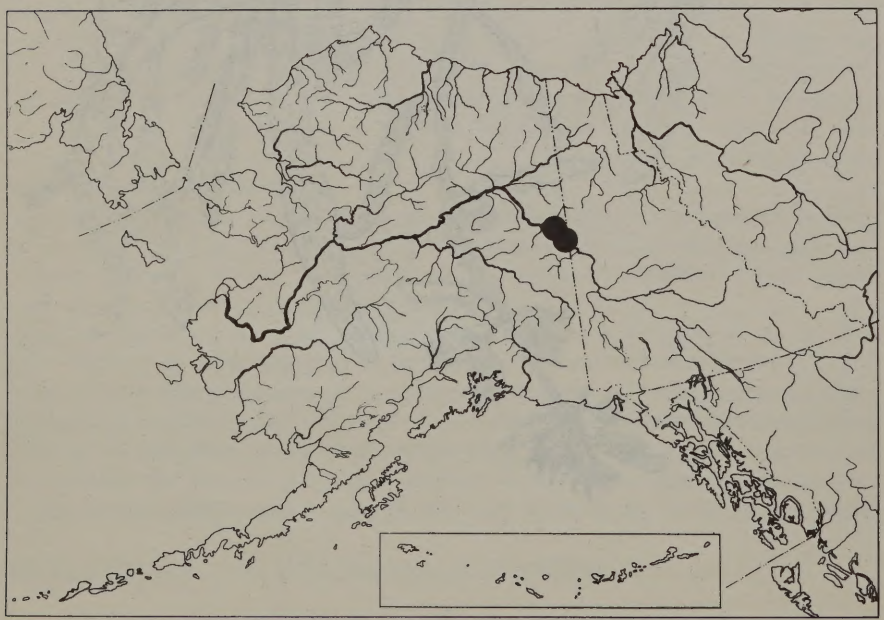
ERIOGONUM FLAVUM var. *AQUILINUM* J. Reveal

This wild buckwheat has a stout, woody, branched caudex, is strongly caespitose, and can form luxuriant hemispherical clumps. Many short, leafless stems are topped by umbelliform clusters of bright yellow flowers. Also diagnostic is the very dense arrangement of basal leaves that are covered with a white tomentum that is especially thick and feltlike on the undersurfaces.

It grows on steep, dry south-facing treeless slopes on Kathul Mountain and at the type locality, Eagle, where it is today locally common and more abundant than reported by Reveal (in Hultén 1967).

Variety *aquilinum* is most closely related to var. *xanthum* Small of the Colorado Rocky Mountains, differing only by its four-lobed involucre.

Endangered status is proposed, but it is entirely possible more of this taxon will be found in the upper Yukon River Valley in both Alaska and adjacent Yukon.



Eriogonum flavum var. *aquilinum*

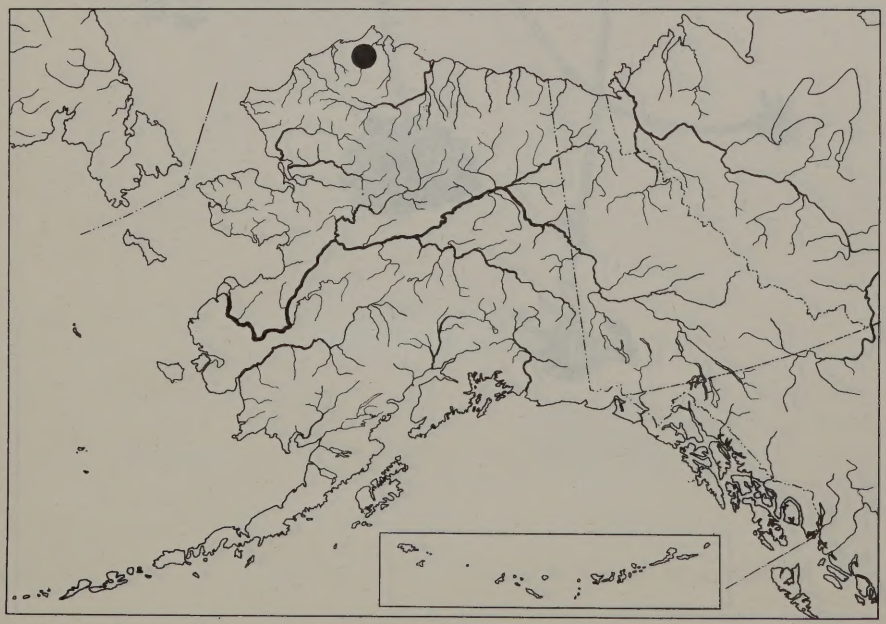
MERTENSIA DRUMMONDII (Lehm.) G. Don Drummond bluebell
Mertensia lanceolata var. *drummondii* (Lehm.) B. Boivin

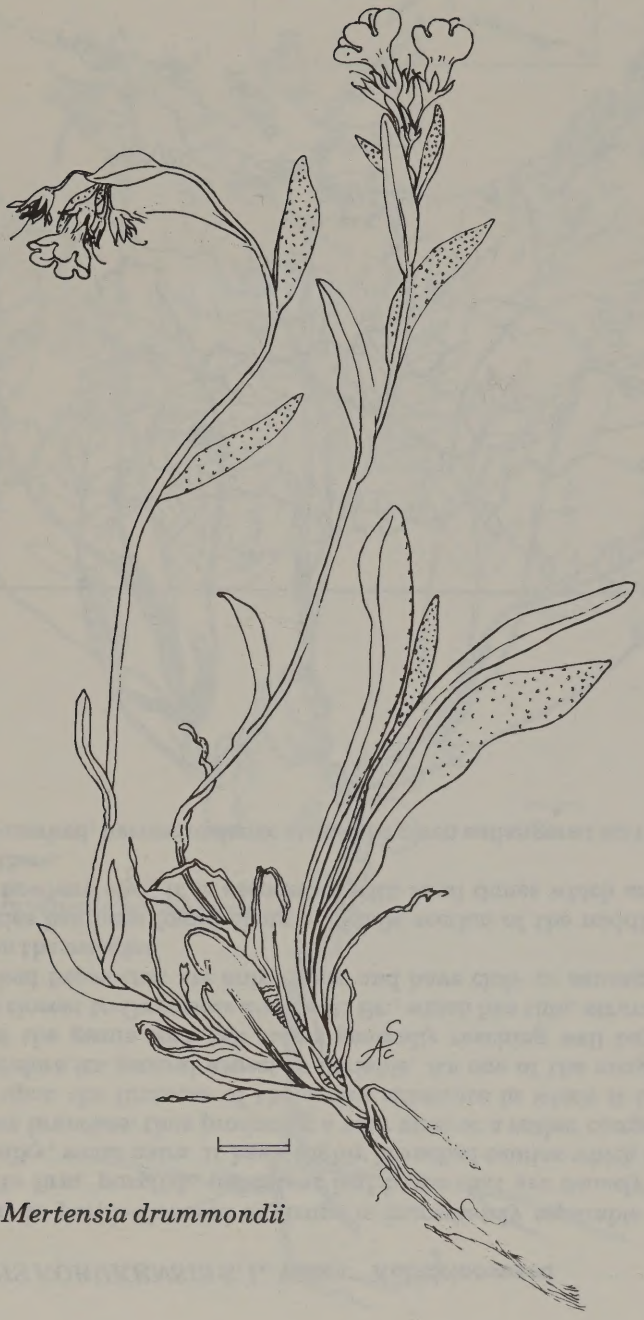
This taxon has long-petiolate, oblanceolate basal leaves and short-petiolate, lanceolate stem leaves, both sets conspicuously white-tuberculate on the upper surfaces. The inflorescence on glabrous pedicels consists of several blue flowers with narrow tube and flaring lobes. In fruit the corolla falls away, but a long style is persistent, at the base of which are four nutlets (characteristic of borages) with somewhat roughened surfaces.

In Alaska *M. drummondii* is restricted to an area of sand dunes on the Meade River on the western Arctic Coastal Plain. It is otherwise known in the western Canadian Arctic from Victoria Island and Dolphin and Union Straits.

This plant is really quite unlike other species of *Mertensia* in Alaska, but it is very similar to *M. lanceolata* (Pursh) DC. and *M. viridis* A. Nelson of the southern Rocky Mountains.

Endangered status is proposed for this taxon, since it very rare in both the United States and Canada.





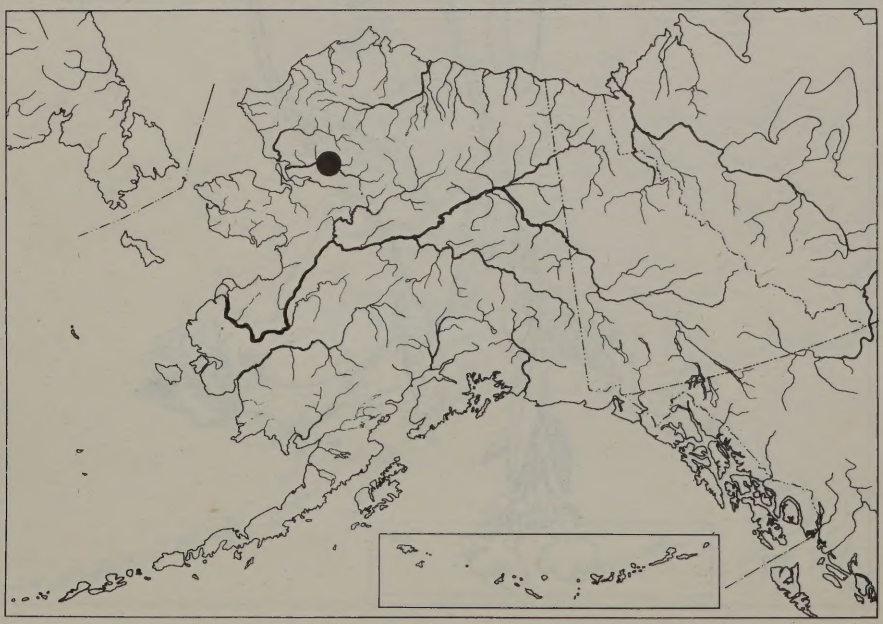
Mertensia drummondii

OXYTROPIS KOBUKENSIS S. L. Welsh Kobuk locoweed

This pink- to purple-flowered oxytrope is immediately separable from all others by its firm, purplish, persistent leaf bases that are densely covered with long, silky, white hairs. It has a highly branched caudex which can have long or short branches, thus producing a very open or a rather compact form depending upon the firmness of the sandy substrate in which it is always found. Therefore its general aspect is variable. As one of the nonglandular members of the genus with tall stems generally reaching well beyond the leaves, it is closest to *Oxytropis arctica* R. Br., which has thin, straw-colored, persistent leaf bases that are only ciliate and have club- or sausage-shaped processes on the margins.

This species has been found along a 25-mile section of the middle Kobuk River, but nowhere else. It is associated with sand dunes which are locally prominent there.

This well-marked, narrow endemic should be given endangered status.



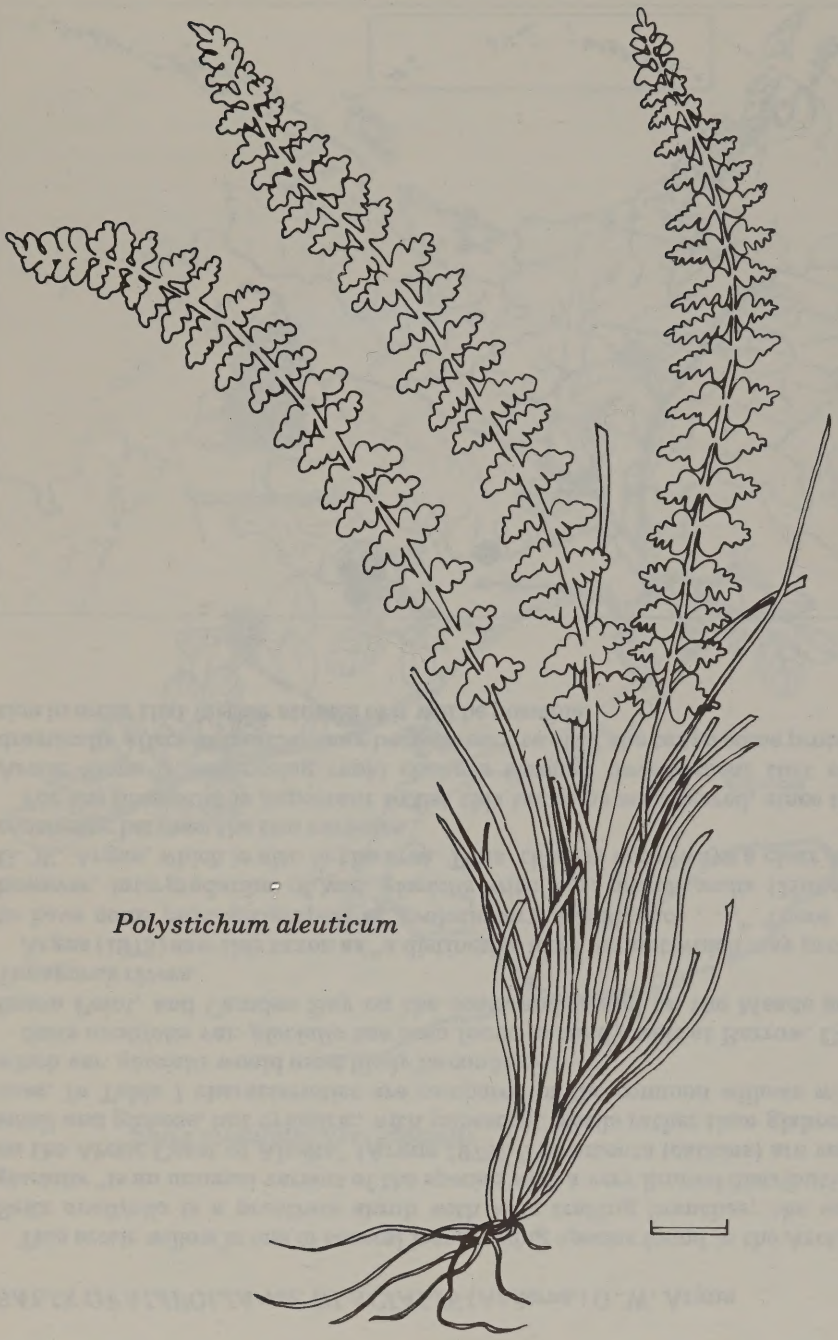
Oxytropis kobukensis

POLYSTICHUM ALEUTICUM Christensen Aleutian Holly-fern, Aleutian Shield-fern

This small fern is only about 150 mm tall and arises from a thick, dark brown rhizome with brown scales and numerous chestnut-brown remains of frond bases. In size and form it resembles *Woodsia alpina* (Bolton) S. F. Gray, but has circular or oblong indusia rather than the indusia of hairlike segments typical of *Woodsia*.

Until quite recently *P. aleuticum* was known only from its type locality on Atka Island in the western Aleutian Islands. It has been reported for nearby Adak Island on a steep, north-facing grassy slope at the protected base and in the crevices of basalt outcrops there (M.P. Williams, *in litt.*, 1978 FWS files).

Endangered status is considered appropriate for this species.



Polystichum aleuticum

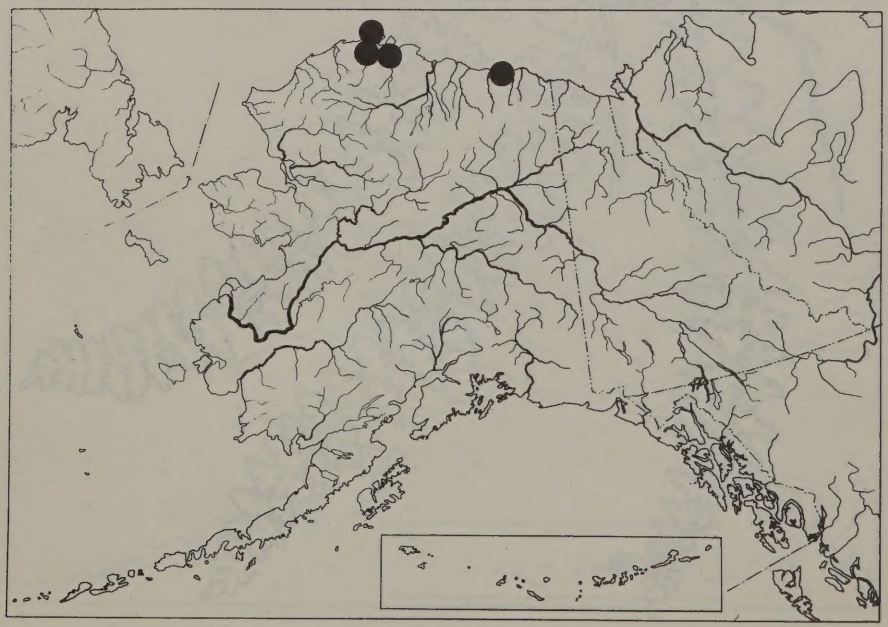
SALIX OVALIFOLIA var. *GLACIALIS* (Anderss.) G. W. Argus

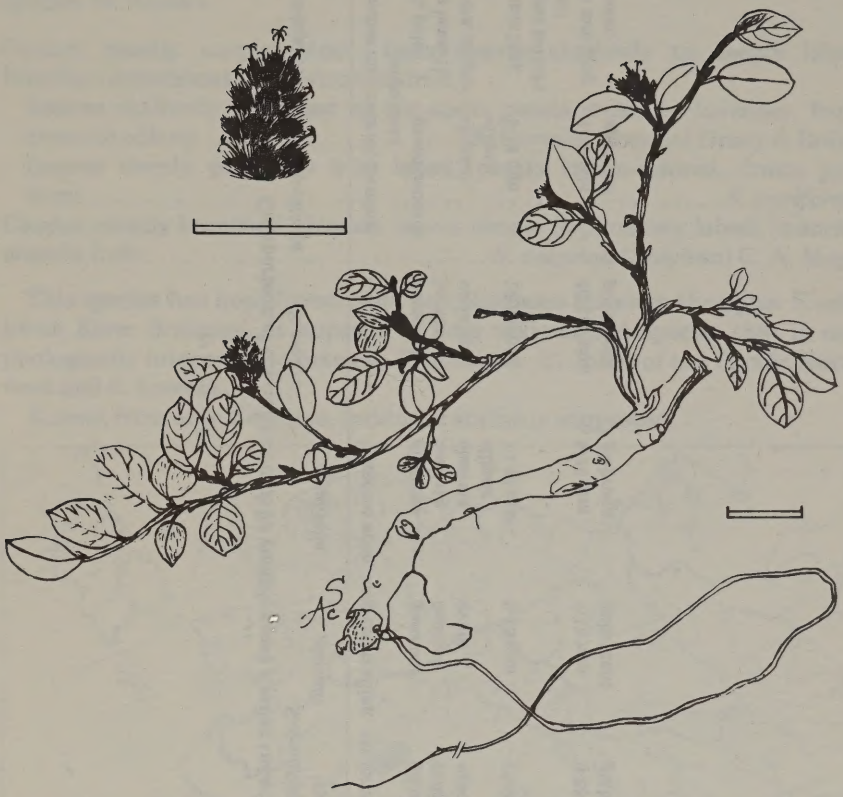
This arctic willow is one of several low-growing species found in the Arctic. *Salix ovalifolia* is a prostrate shrub with long trailing branches; the var. *glacialis* "is an unusual variant of the species with a very limited distribution on the Arctic Coast of Alaska" (Argus 1973). The aments (catkins) are very small and globose, not cylindric, with pubescent pistils rather than glabrous ones. In Table 1 characteristics are compared of the common willows with which var. *glacialis* would most likely be confused.

Salix ovalifolia var. *glacialis* has been found in sandy soils at Barrow, Collinson Point, and Camden Bay on the coast and inland on the Meade and Topagoruk rivers.

Argus (1973) saw this taxon as "a distinctive local variant which may prove to have some phytogeographic or evolutionary significance . . ." There is, however, intergradation of var. *glacialis* with var. *arctolitoralis* (Hultén) G. W. Argus, which is also in the area. Thus, there is not always a clear discontinuity between the two varieties.

For the present it is important to list this taxon as endangered, since the Arctic Slope is undergoing rapid changes through development that can drastically affect habitat. It may be necessary to offer the taxon some protection in order that further studies of it will be possible.





Salix ovalifolia var. *glacialis*

Table 1. Comparison of the *Salix ovalifolia* complex and similar taxa

	S. phlebophylla	*S. rotundifolia*	*S. arctica*	*S. ovalifolia*			
				ovalifolia	*glacialis*	*cyclophylla*	*arctolitoralis*
Habit	branches intertwined, forming large mats			branches open, long and trailing, not forming dense mats			
Leaves	green, pale green beneath	green beneath	glaucous beneath	glaucous beneath	glaucous beneath	glaucous beneath	glaucous beneath
	obovate, elliptic	circular, elliptic	variable	obovate, elliptic	ovate	subcircular	elliptic
	7-15 mm long (largest mature leaves)	5-14 mm	19-85 mm	13-28 mm	8-15 mm	13-28 mm	25-46 mm
Aments	16-25 mm long	7-20 mm	40-120 mm	9-28 mm	7-13 mm	9-28 mm	20-25 mm
Fruits	pubescent	glabrous	pubescent	glabrous	pubescent	glabrous	glabrous

SMELOWSKIA PYRIFORMIS Drury & Rollins

Smelowskia pyriformis has the stout caudex, basal leaf cluster, and decumbent stems with several flowers (or fruits) that are seen in other taxa of the genus *Smelowskia.* It differs from the others found in Alaska most clearly by its pyriform (pear-shaped) fruits and its basal leaves that are pinnately cut to form several deep lobes. Also the stems are both simple and branched, and the petals are cream-colored, not lavender. The key below distinguishes the three species in Alaska.

Caudex mostly simple, stout; basal leaves shallowly to deeply lobed; branches decumbent to prostrate in fruit

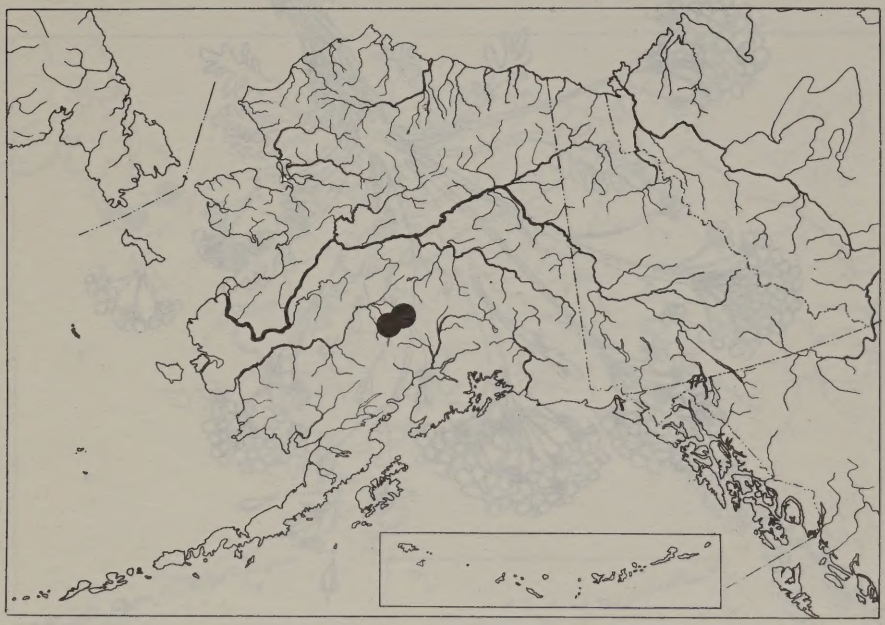
Leaves shallowly 3-5 lobed at the apex, petals cream to lavender, fruits ovate to oblong ..... *S. borealis* (Greene) Drury & Rollins

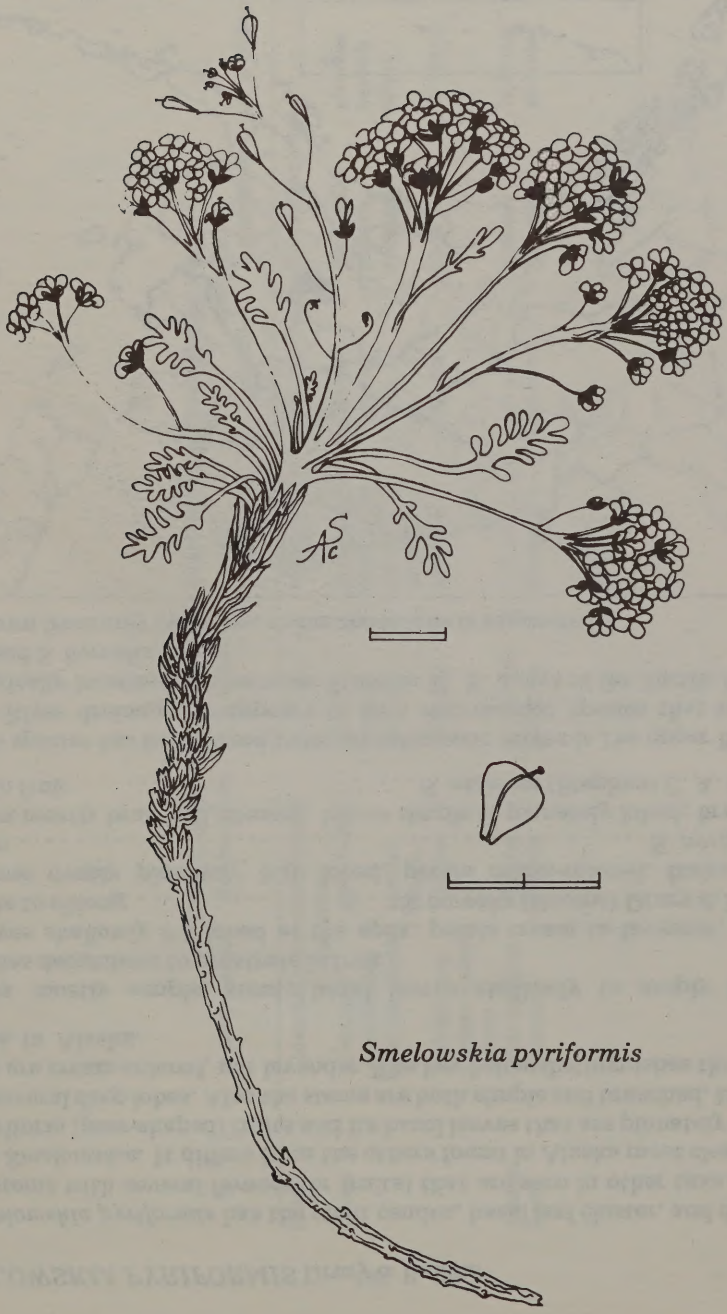
Leaves deeply pinnately 5-10 lobed, petals cream-colored, fruits pyriform ..... *S. pyriformis*

Caudex mostly branched, slender; leaves simple to pinnately lobed; branches erect in fruit ..... *S. calycina* (Stephan) C. A. Meyer

This species has been found twice on calcareous screes in the upper Kuskokwim River drainage. It appears to be a well-marked species that is morphologically intermediate between *S. ovalis* M. E. Jones of the Pacific Northwest and *S. borealis.*

Known from only two sites, endanged status is suggested.





Smelowskia pyriformis

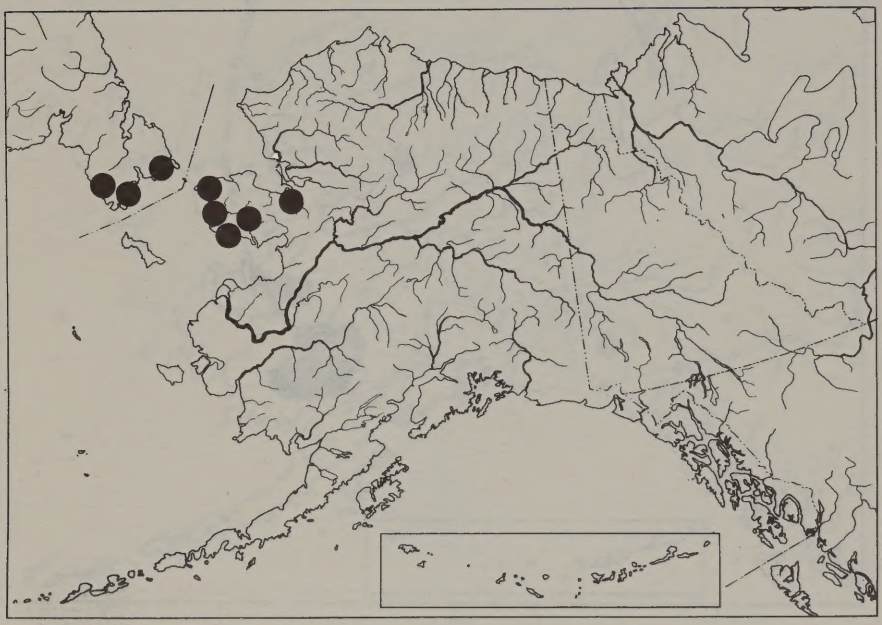
PART 2. THREATENED TAXA

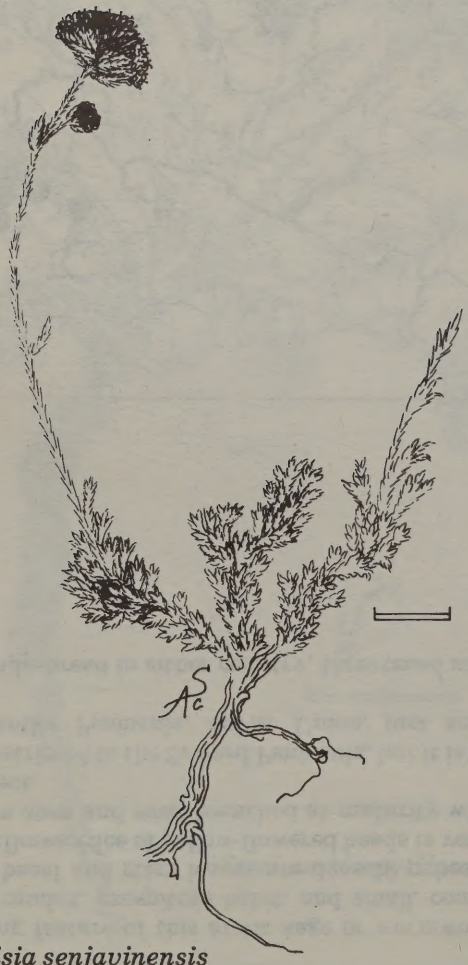
ARTEMISIA SENJAVINENSIS Besser
?=Artemisia androsace Seemann

The most striking feature of this arctic sage or wormwood is its densely branching woody caudex, caespitose habit, and small, compact rosettes of basal leaves. The basal and stem leaves are densely pubescent with shiny-white hairs. The inflorescence of yellow-flowered heads is very compact when young, but is more open and even branched at maturity when it presents a quite different aspect.

In Alaska it is restricted to the Seward Peninsula, but it is also found on the easternmost Chukotka Peninsula, Soviet Union, just across the Bering Strait.

Since it is not widespread in either country, threatened status is proposed for this species.





Artemisia senjavinensis

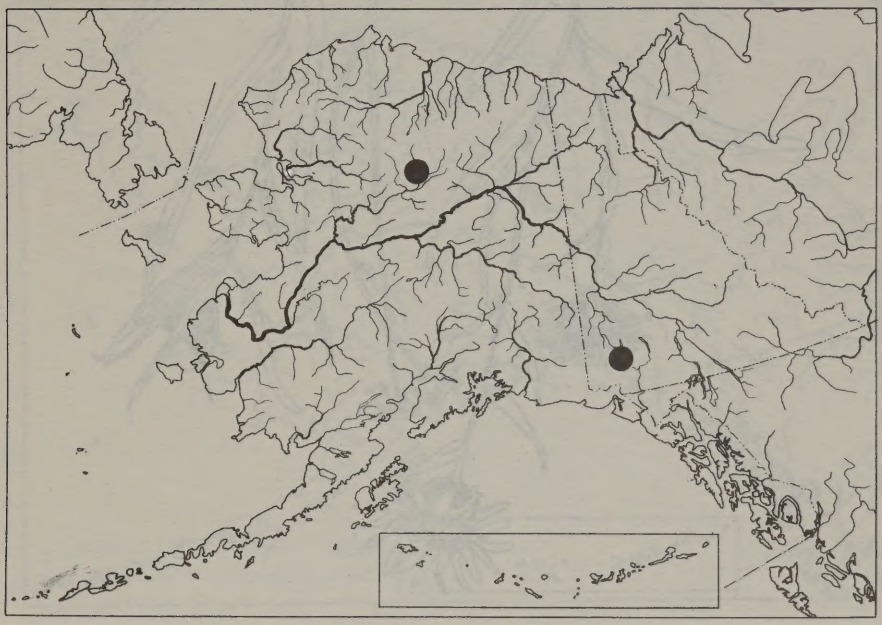
ASTER YUKONENSIS A. Cronquist

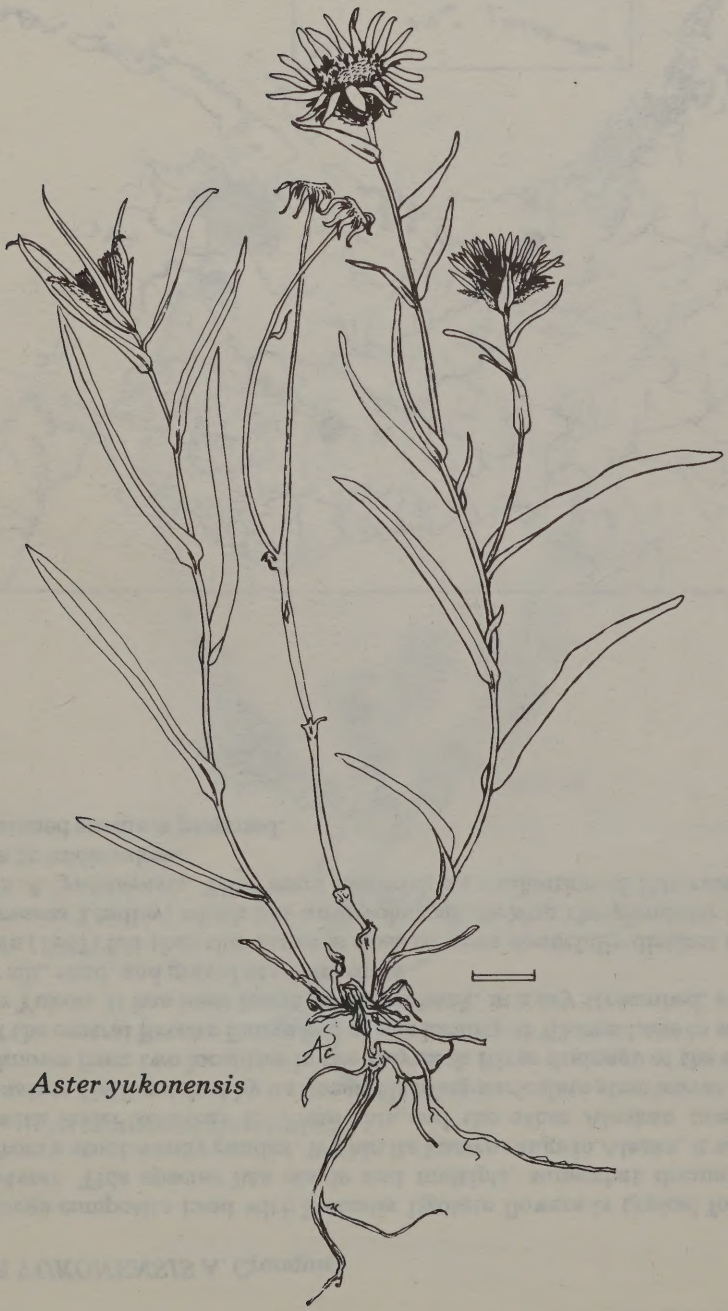
The large composite head with lavender ligulate flowers is typical for the genus *Aster*. This species has single and multiple, somewhat decumbent, stems from a stout woody caudex. Within its known range in Alaska, it will be found with *Aster sibiricus* L. From this and the other Alaskan taxa, *A. yukonensis* is distinguished by its linear, clasping-auriculate stem leaves.

It is known from two localities in the Koyukuk River drainage of the south slope of the central Brooks Range and at one locality at Kluane Lake in southwestern Yukon. It has been found on a riverbank, in a dry streambed, and in the dry silt, sand, and gravel of a river delta.

Hultén (1967) felt that this taxon is close to, even doubtfully distinct from, *A. pygmaeus* Lindley, which has an involucrum lacking the glandular hairs found in *A. yukonensis*. With more material, an evaluation of this relationship can be undertaken.

Threatened status is proposed.





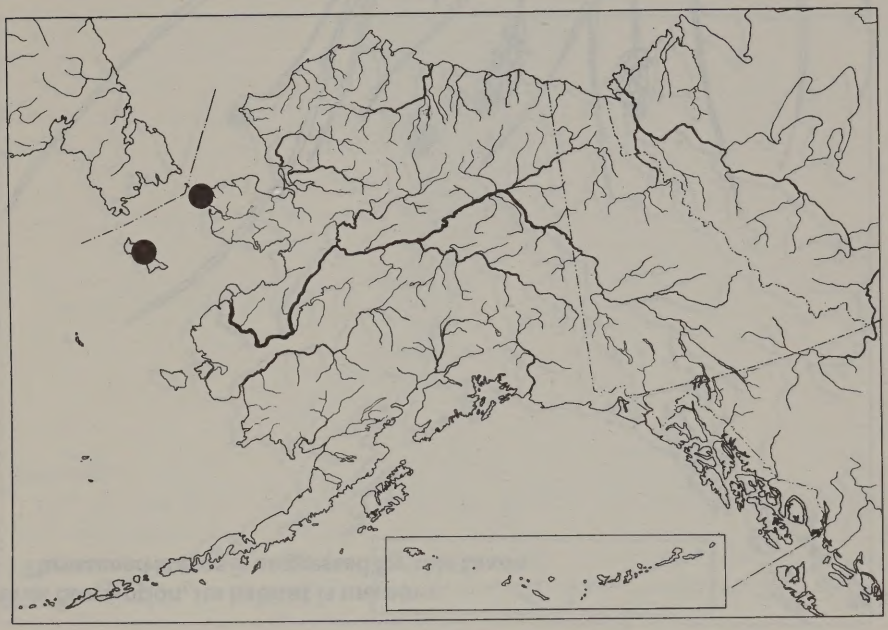
Aster yukonensis

CAREX JACOBI-PETERI Hultén Anderson sedge

This small sedge is one of several species in the genus *Carex* with only a single terminal spike on each culm. In this instance the spike has staminate flowers at the summit of the spike and distigmatic pistillate flowers beneath. It is low-growing and forms tufts; the culms are short and do not grow taller than the leaves. Both *Carex ursina* Dewey and *C. nardina* E. Fries are similar, and the three are distinguished in the key below.

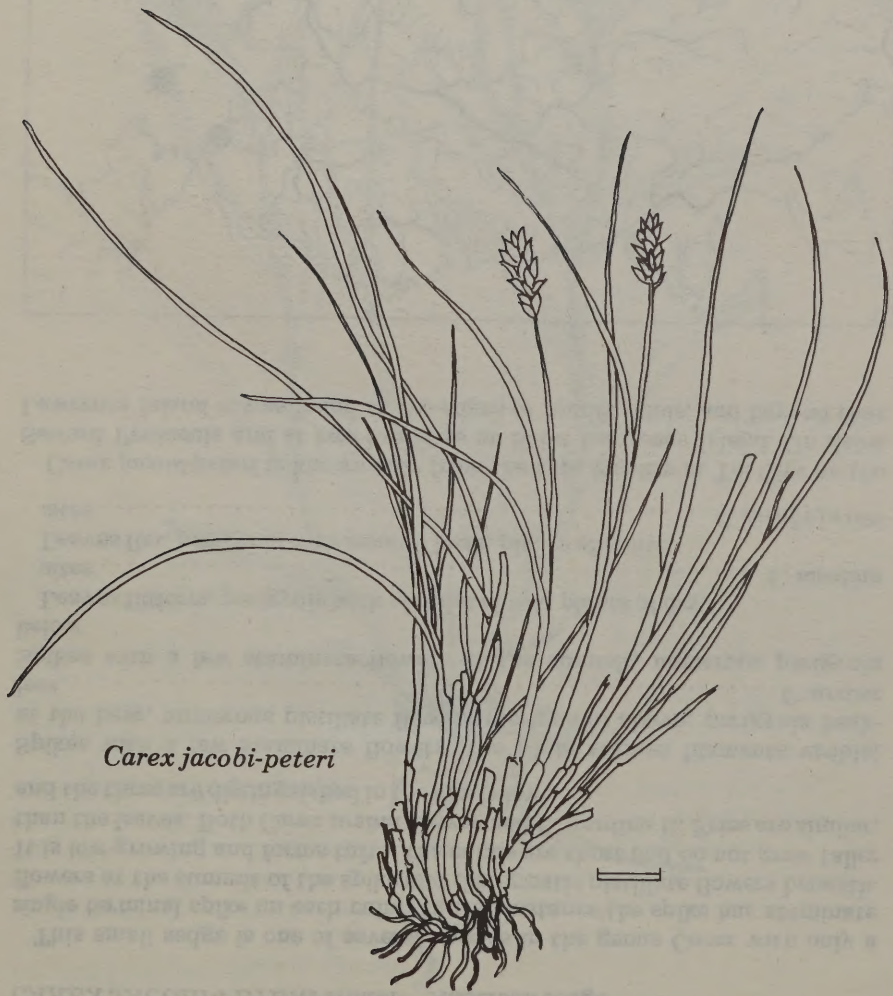
Spikes with a few staminate flowers (the white stamen filaments visible) at the base, numerous pistillate flowers (perigynia) above; perigynia beakless..... *C. ursina*
Spikes with a few staminate flowers at the summit, numerous perigynia below
Leaves filiform, perigynia with serrulate beak, plants of dry sites..... *C. nardina*
Leaves flat, perigynia with smooth beak, plants of moist sites..... *C. jacobi-peteri*

Carex jacobi-peteri is known only from the type locality at Tin City on the Seward Peninsula and at two localities on Saint Lawrence Island. On Saint Lawrence Island it was found at the edges of tundra pools, and beyond that



brief description, its habitat is unknown.

Threatened status is suggested for this taxon.



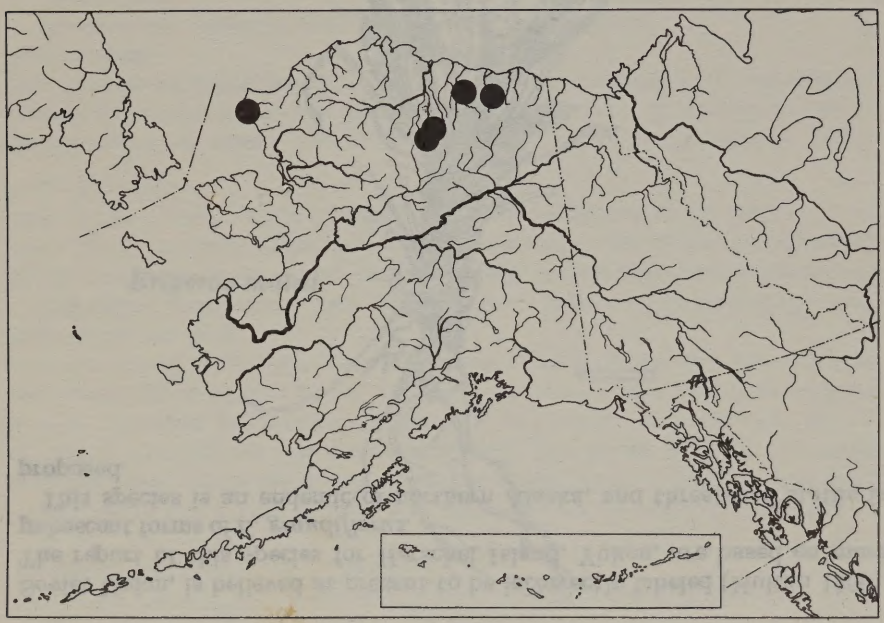
Carex jacobi-peteri

ERIGERON MUIRII A. Gray
Erigeron grandiflorus ssp. *muirii* (A. Gray) Hultén

This striking fleabane is immediately recognizable by the dense, even tufted, lanate soft woolly hairs of its leaves, stems, and involucrum. Its closest morphological relatives are *Erigeron caespitosus* Nuttall, *E. hyperboreus* E. L. Greene and *E. grandiflorus* W. J. Hooker. It is distinguished from these in the key below.

Involucrum with short, stiff hairs ..... *E. caespitosus*
Involucrum with long, soft, woolly hairs
  Upper stem leaves linear, hairs of involucrum with purple-black cross-walls ..... *E. hyperboreus*
  Upper stem leaves lanceolate, hairs of involucrum white or yellowish
    Leaves and involucrum with long, white hairs ..... *E. grandiflorus*
    Leaves and involucrum thickly covered with tangled woolly hairs, those of the involucrum yellowish ..... *E. muirii*

Erigeron muirii is known from a few localities in arctic Alaska: Cape Thompson, Anaktuvuk Pass, Kanyut Lake, Sagwon uplands, Canning River. It is found on dry slopes at these sites. Fewer sites are recorded here than were reported by Hultén (1968), for it has not been possible to document all of the dots he mapped. A single specimen purportedly from Wrangel Island,



Soviet Union, is believed at present to be incorrectly labeled (Hultén 1950). The report of this species for Herschel Island, Yukon, are based on more pubescent forms of *E. grandiflorus*.

This species is an endemic of northern Alaska, and threatened status is proposed.

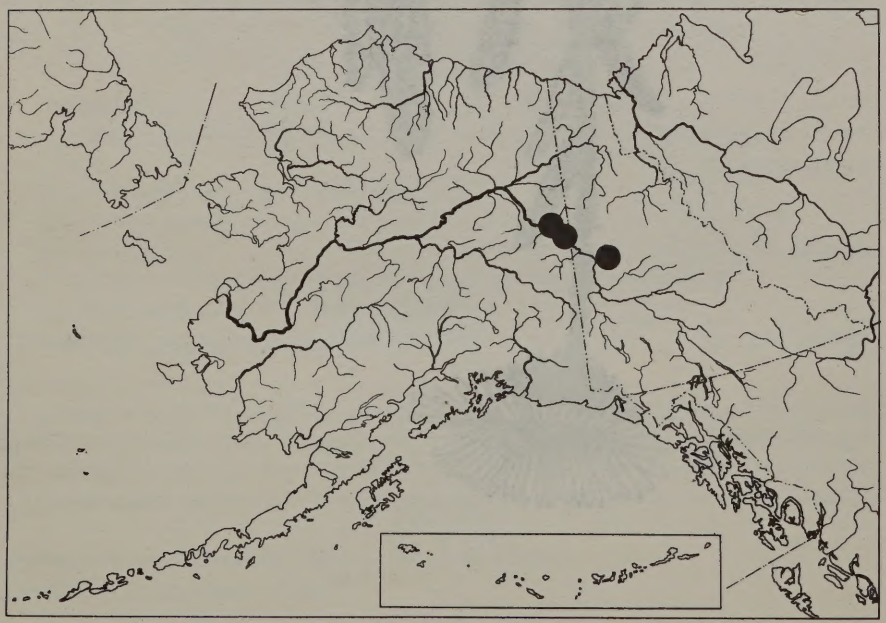
Erigeron muirii

ERYSIMUM ASPERUM var. *ANGUSTATUM* (Rydberg) B. Boivin
Erysimum angustatum P. A. Rydberg

This taxon has a long taproot and thick caudex on which the remains of previous years' leaf bases create, where not eroded away, a distinctive pattern of tightly overlapping triangular segments. The leaves forming the basal rosette are either predominately coarsely toothed or predominately entire, the former up to 10 mm broad, the latter as narrow as 2 mm. The capitate inflorescence of large yellow flowers elongates at maturity and bears slender fruits 20-90 mm long.

This yellow wallflower is distinguished from taxa in other mustard genera by the two- and three-forked (predominately two-forked), sessile hairs that cover the surfaces of stems, leaves, pedicels, and fruits. It can be separated from the two other yellow-flowered species in the genus by the features used in the key below.

Sessile hairs on stems, leaves, pedicels, and fruits predominately three-forked; flowers small, 4-5 mm long..... *E. cheiranthoides* L.
Sessile hairs on stems, leaves, pedicels, and fruits predominately two-forked; flowers large
Flowers with petals 12 mm long or longer, beak of fruit
3-5 mm long..... *E. asperum* var. *angustatum*

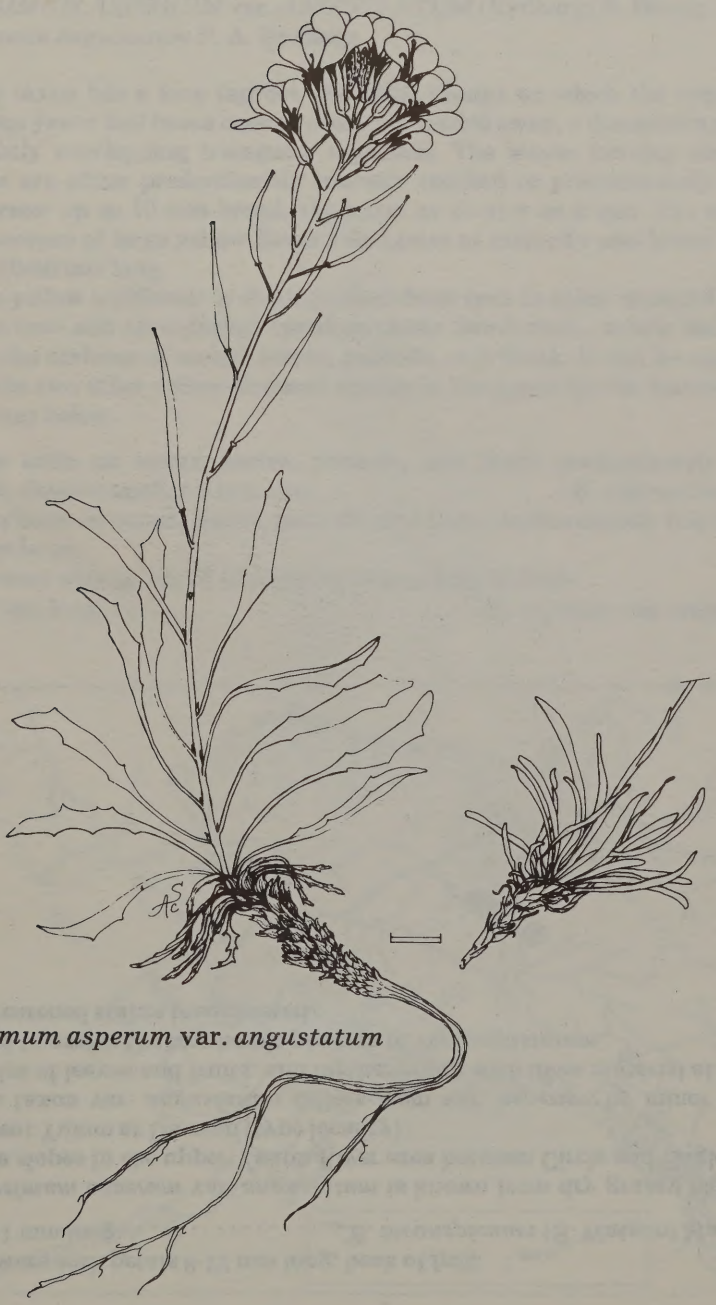


Flowers with petals 8-12 mm long, beak of fruit 0.3-1 mm long ..... *E. inconspicuum* (S. Watson) MacMillan

Erysimum asperum var. *angustatum* is known from dry grassy bluffs and rubble slopes in the upper Yukon River area between Circle and Eagle and in adjacent Yukon at Dawson (type locality).

The taxon var. *angustatum* differs from var. *asperum* by minor characteristics of leaves and fruits, and further study with more material at hand is needed to assess the taxonomic position of var. *angustatum.*

Threatened status is suggested.



Erysimum asperum var. *angustatum*

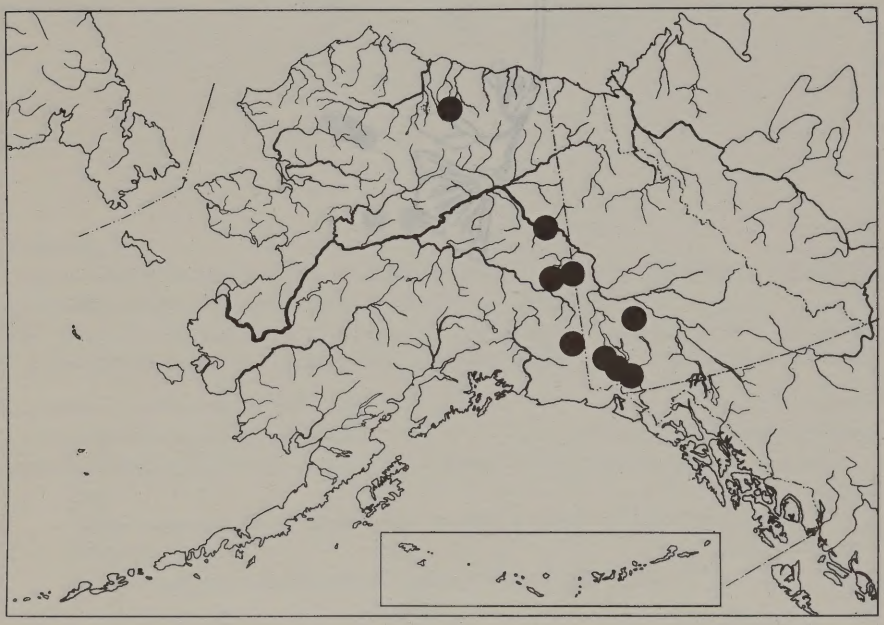
MONTIA BOSTOCKII (A. E. Porsild) S. L. Welsh
Claytonia bostockii A. E. Porsild

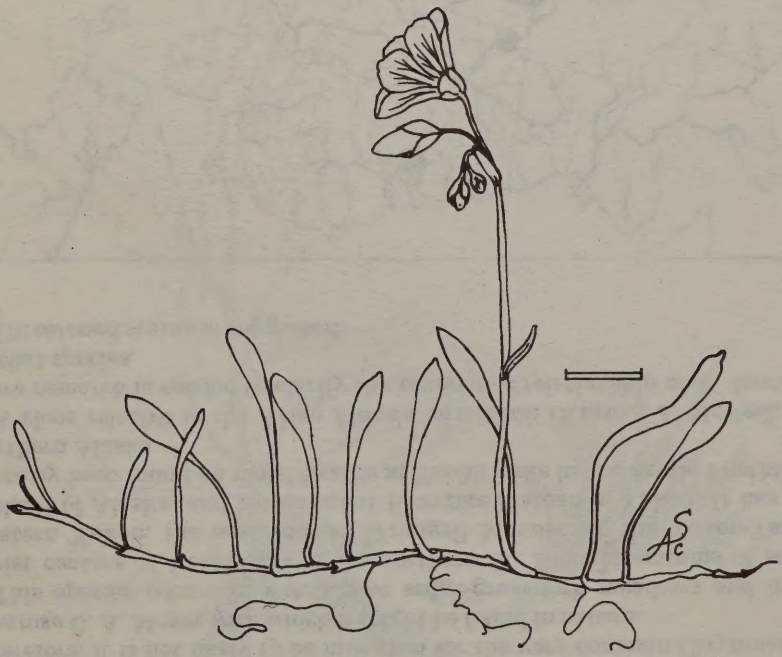
Until recently *Montia bostockii* has been treated as a *Claytonia*, and it does share with members of that genus the delicate showy flowers with five petals that are white, pink, or pink-tinged, with the veins of the petals often a sharply contrasting red. It differs from all claytonias by not having a single pair of opposite leaves below the inflorescence, nor does it have a rosette of basal leaves. What is so striking and diagnostic are the long, leafy stolons with fleshy leaves and the one to three alternate leaves below the inflorescence. Therefore, it is not likely to be mistaken for the very common *Claytonia sarmentosa* C. A. Meyer with which it might be found in nature.

This species occurs in wet, alpine sedge-grass-forb meadows and in the moist centers of frost scars in the northern St. Elias Mountains of southwestern Yukon, the easternmost Wrangell Mountains, the Yukon-Tanana Upland of Alaska, and the adjacent Klondike Plateau in Yukon. It has only recently been found on moist heaths at Toolik Lake in the Arctic Foothills of northern Alaska.

A close relative is the Asian *Montia vassilievii* (Kuzen.) J. McNeill, and more research is needed to clarify the taxonomic relationship of *M. bostockii* to that species.

Threatened status is suggested.



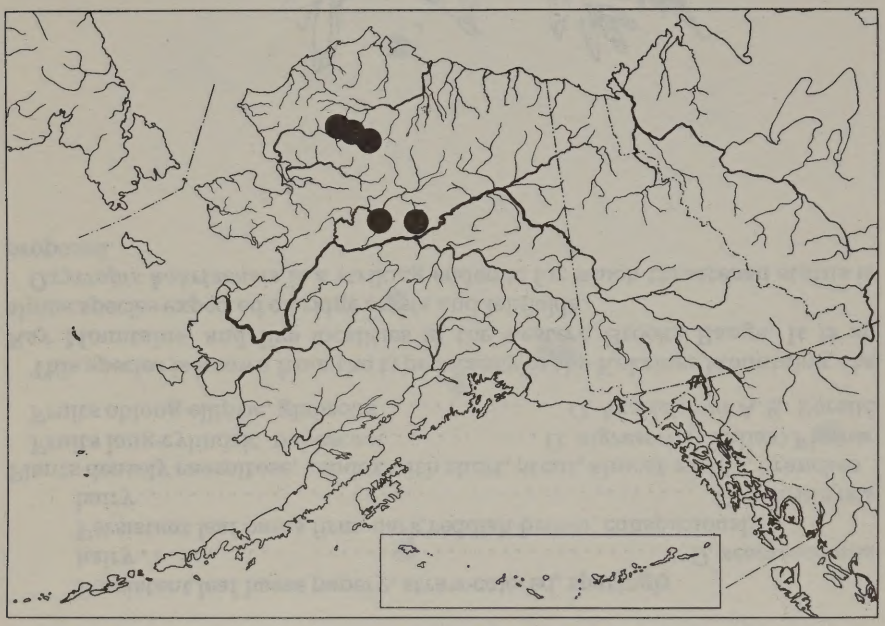


Montia bostockii

OXYTROPIS KOKRINENSIS A. E. Porsild

Oxytropis kokrinensis is one of the arctic-alpine, caespitose, blue-flowered oxytropes with erect fruits and nonglandular foliage and calyx. It differs from the others mainly by having a branched caudex covered with persistent, dark reddish-brown bases of previous years' leaves. The green leaves of the current year and the youngest of the reddish older leaves and leaf bases are conspicuously pubescent with soft, white hairs. The flowering stems bear only one to three flowers and do not generally grow taller than the leaves. In habit it most closely resembles *Oxytropis scammaniana* Hultén. The key below will assist in separating *O. kokrinensis* from its morphological relatives. If flowers are absent, it would be difficult to distinguish *O. kokrinensis* from the yellow-flowered *O. maydelliana* Trautvetter, which has larger, sparingly hairy, chestnut-brown persistent leaf bases.

Plants loosely caespitose, caudex with long branches
  Leaves with 1-5 leaflets ..... *O. mertensianus* Turczaninow
  Leaves with more than 5 leaflets
    Margins of persistent leaf bases with club- or sausage-shaped processes ..... *O. arctica* R.Br.
    Margins of persistent leaf bases without club- or sausage-shaped processes



Persistent leaf bases papery, straw-colored, sparingly hairy ..... *O. scammaniana*

Persistent leaf bases firm, dark reddish-brown, conspicuously hairy ..... *O. kokrinensis*

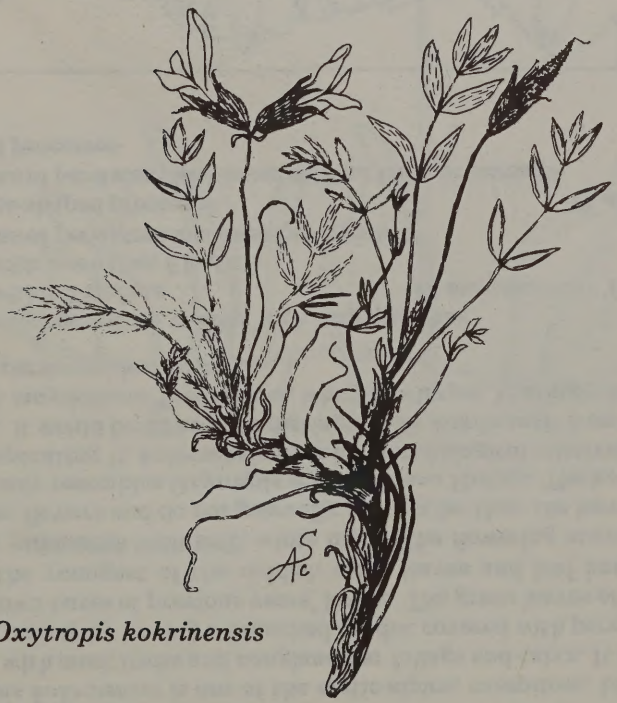
Plants densely caespitose, caudex with short, stout, almost woody, branches

Fruits long-cylindric, pubescent ..... *O. nigrescens* (Pallas) Fischer

Fruits oblong-elliptic, glabrous ..... *O. huddelsonii* A.E. Porsild

This species is known from the type locality in the Kokrines Mountains, the Ray Mountains, and five localities in the western Brooks Range. It is an alpine species expected on ridge crests and fellfields.

Oxytropis kokrinensis is a striking endemic for which threatened status is proposed.



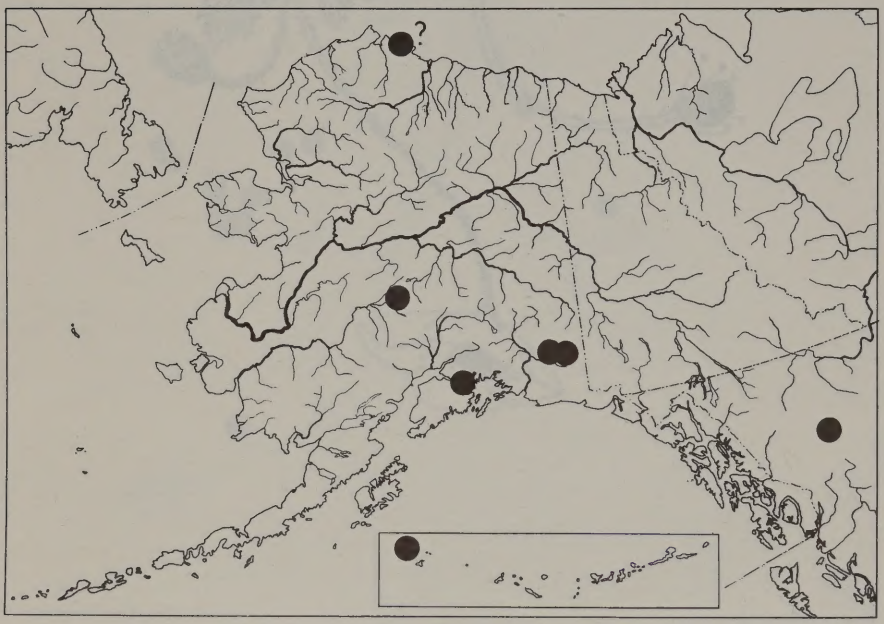
Oxytropis kokrinensis

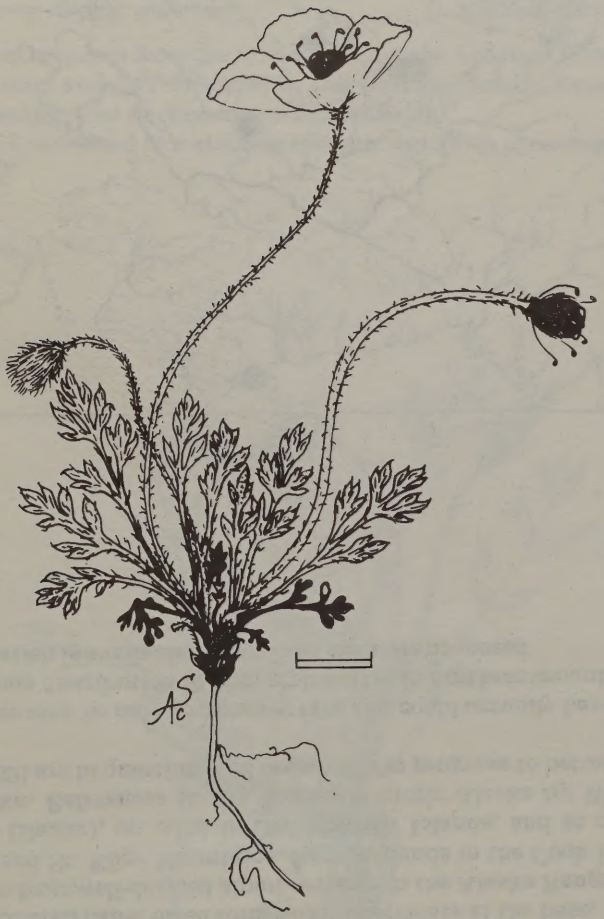
PAPAVER ALBOROSEUM Hultén Pale poppy

The scientific name of this small poppy is derived from the color of its petals: white suffused with pink (mother-of-pearl) and with a yellow basal spot. It tends to be strongly caespitose with glaucescent leaves. The stems are typically bent over and bowlike. The fruit is broadly ovate with stiff, stout, light-colored hairs, often somewhat tuberculate at the base.

It is known from well-drained alpine settings in the Alaska Range, Wrangell Mountains, and St. Elias Mountains, from lowlands in the Cook Inlet region (at Portage Glacier), on Attu in the Aleutian Islands, and at one locality in Kamchatka. References to the species in arctic Alaska by Wiggins and Thomas (1962) are in question, and research is in progress to better define the taxon there.

This species may be only apparently rare and could actually have a more or less continuous distribution in high alpine sites in northern mountains. Until more information is available, threatened status is proposed.





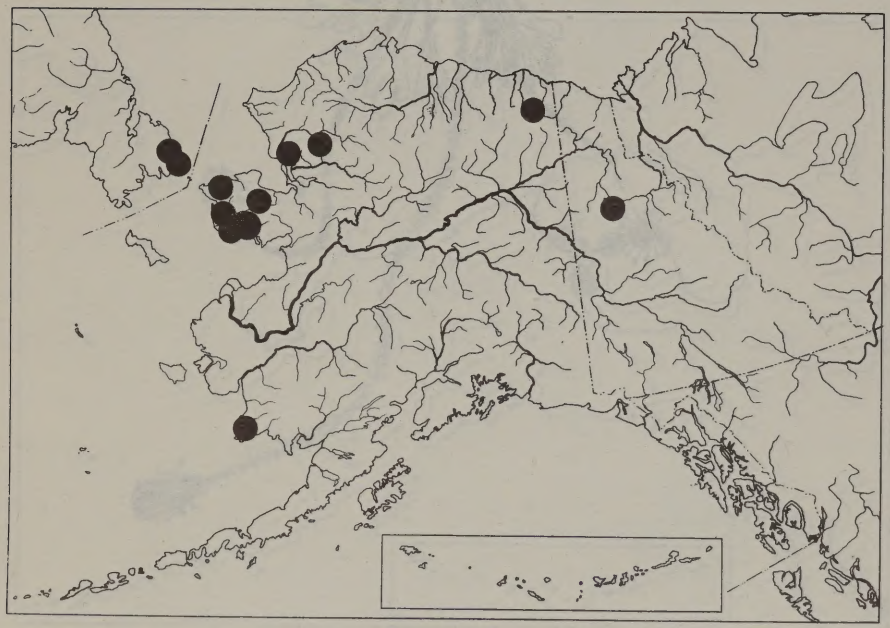
Papaver alboroseum

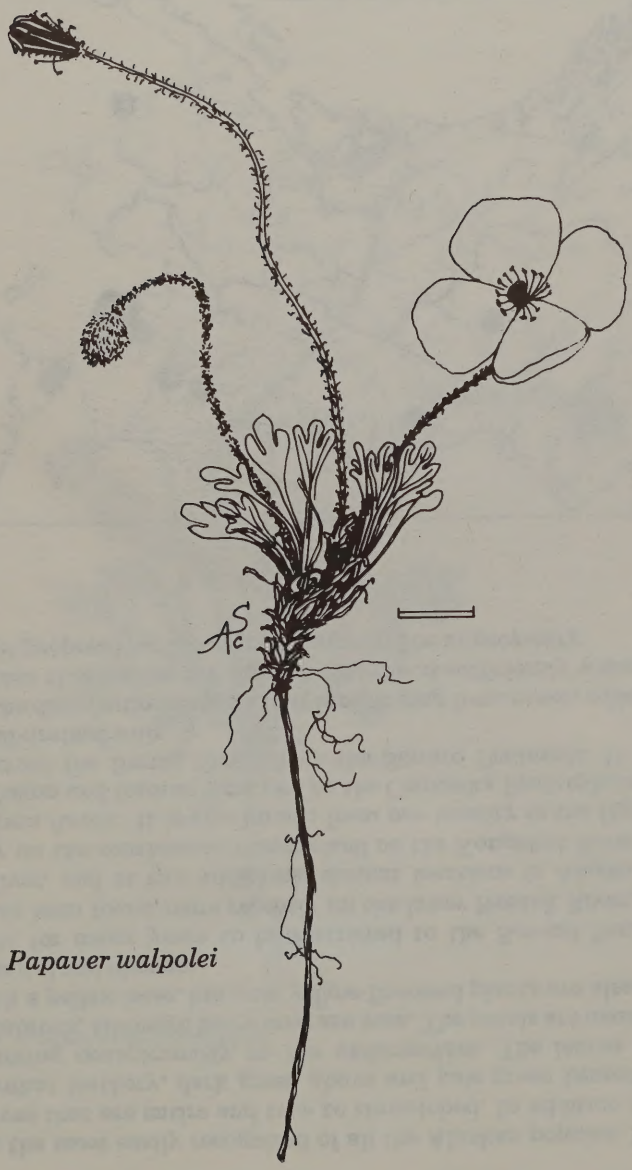
PAPAVER WALPOLEI A. E. Porsild Walpole poppy

This is the most easily recognized of all the Alaskan poppies. It alone has basal leaves that are entire and two- to three-lobed. In addition these leaves are somewhat leathery, dark green above and pale green beneath, with the veins showing conspicuously on the undersurface. The leaves are usually totally glabrous, although hairy ones are seen. The petals are usually white or white with a yellow base, but pale yellow-flowered plants are also found. The fruit is conical and obovate.

Thought for many years to be restricted to the Seward Peninsula, this species has been found more recently on the lower Noatak River, the middle Kobuk River, and at two additional distant locations in Alaska—at Goodnews Bay on the southwestern coast and on the Kongakut River in extreme northeastern Arctic. It is also known from one locality in the Ogilvie Mountains in Yukon and from at least two on the Chukotka Peninsula in the Soviet Union, across the Bering Strait from the Seward Peninsula. It is found in coarse well-drained soils.

Given the distribution pattern that is emerging from recent collections, it is possible that this species will soon be considered sufficiently widespread that the present proposal for threatened status will be unnecessary.





Papaver walpolei

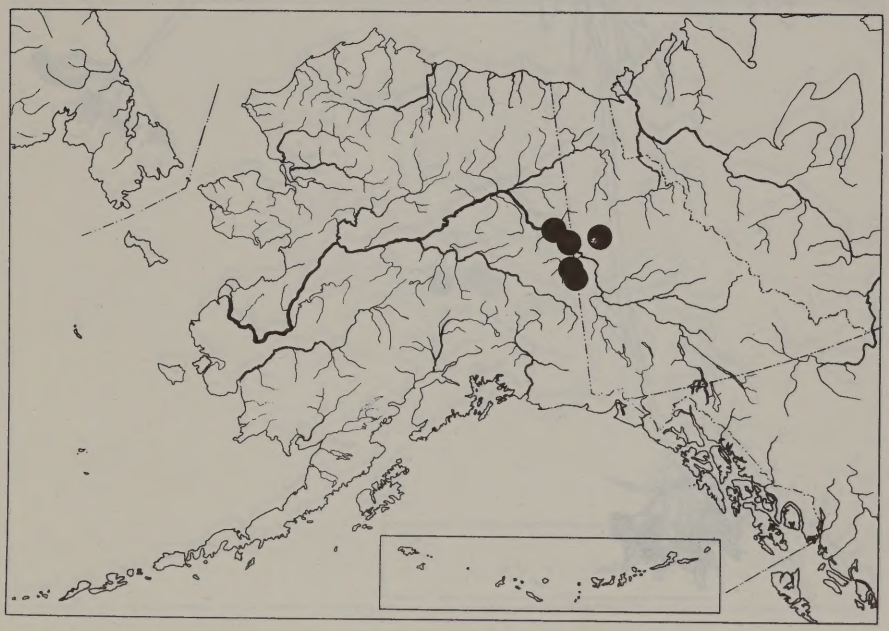
PODISTERA YUKONENSIS Mathias & Constance

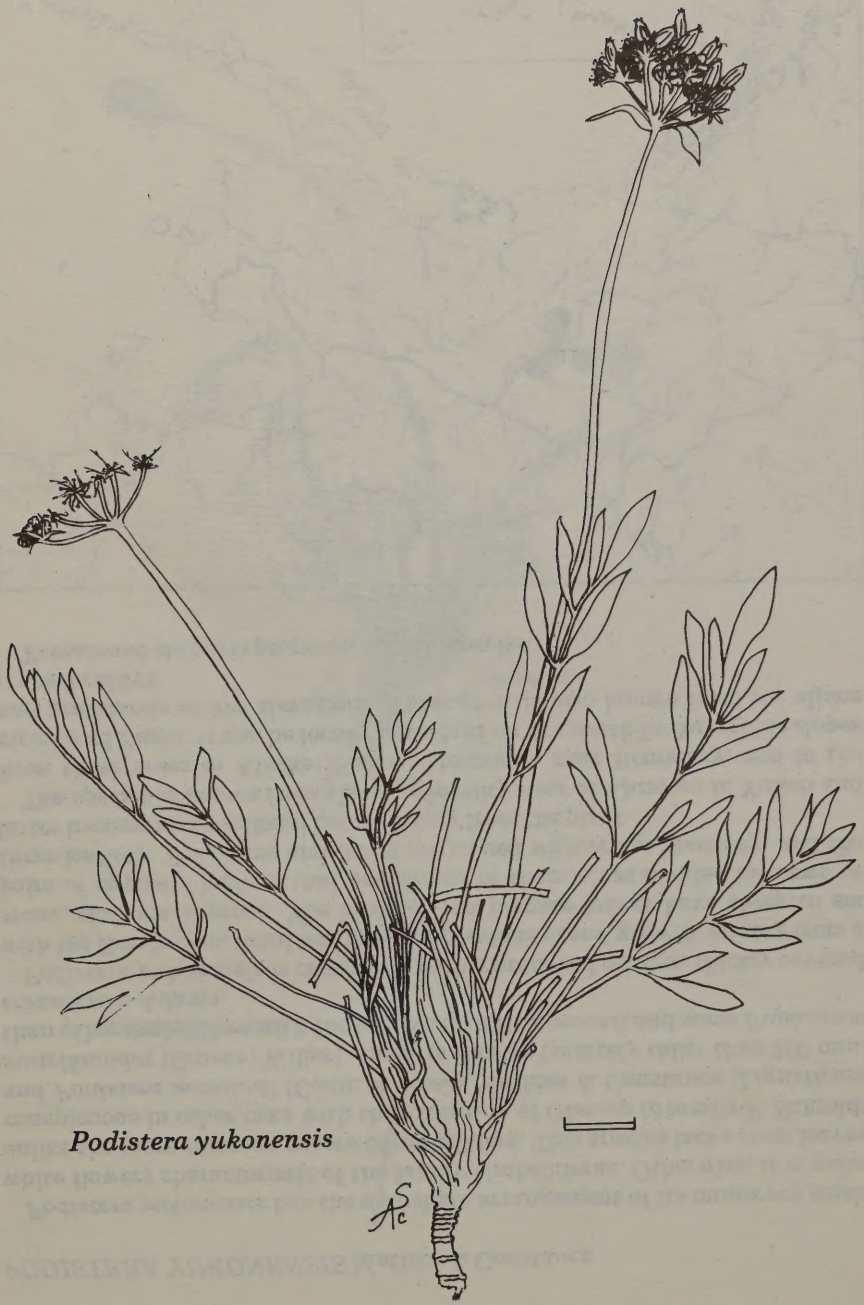
Podistera yukonensis has the umbellate arrangement of its numerous small white flowers characteristic of the family Umbelliferae. Otherwise, it is quite unlike the more common genera of umbellifers. This species lacks stem leaves conspicuous in other taxa with the exception of *Glehnia littoralis* F. Schmidt and *Podistera macounii* (Coult. & Rose) Mathias & Constance [*Ligusticum mutellinoides* (Crantz) Willar], and it is shorter (scarcely taller than 300 mm) than other umbellifers with the exception of *P. macounii* and some *Bupleurum triradiatum* Adams.

Podistera yukonensis is caespitose with a branched caudex, thickly covered with the firm brown, dried leaf bases of previous years' growth, arising from a stout, elongate taproot. The bluish-green pinnate leaves have three to six pairs of opposite leaflets that are simple or themselves divided into two or three leaflets. The stems and fruits are tinged with red at maturity, and the latter become straw-colored before falling from the plant.

The species is known from the type locality near McQuesten in Yukon and from three areas in Alaska: Kathul Mountain, near Boundary, and in the vicinity of Eagle. It can be locally abundant on dry south-facing rubble slopes and grasslands at low elevations, although it is also known from the alpine (type locality).

Threatened status is proposed for this species.





Podistera yukonensis

SMELOWSKIA BOREALIS var. *VILLOSA* Drury & Rollins

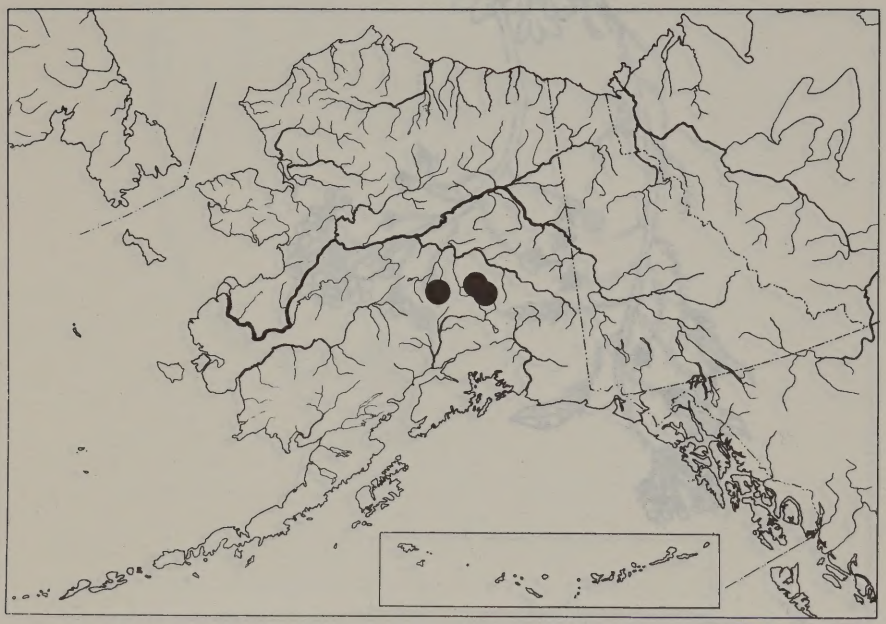
Smelowskia borealis is easily recognized by its long root and rhizome with a very thick and dense basal cluster of the current and previous years' leaves. The grayish-white leaves are shallowly three- to five-lobed at the apex. Its several stems are decumbent (to prostrate in fruit) with long racemes of numerous, small, cream-colored to lavender flowers or oblong to linear fruits.

Variety *villosa* is distinguished on the basis of leaf, stem, and pedicel pubescence of predominately white-villous trichomes and its oblong fruits; the pubescence of the pedicels is particularly dense.

This taxon is known only from the type locality on Sable Mountain in Mount McKinley National Park, at Dry Creek, and at Rainbow Mountain, all in the Alaska Range. It is found on calcareous screes at the highest elevations.

Studies of variation in *S. borealis* var. *villosa in situ* are required to determine if this variant is worthy of formal taxonomic recognition.

Mountain summits in remote areas may yield further records for the taxon. Nevertheless, threatened status is considered reasonable for the present.



Smelowskia borealis var. *villosa*

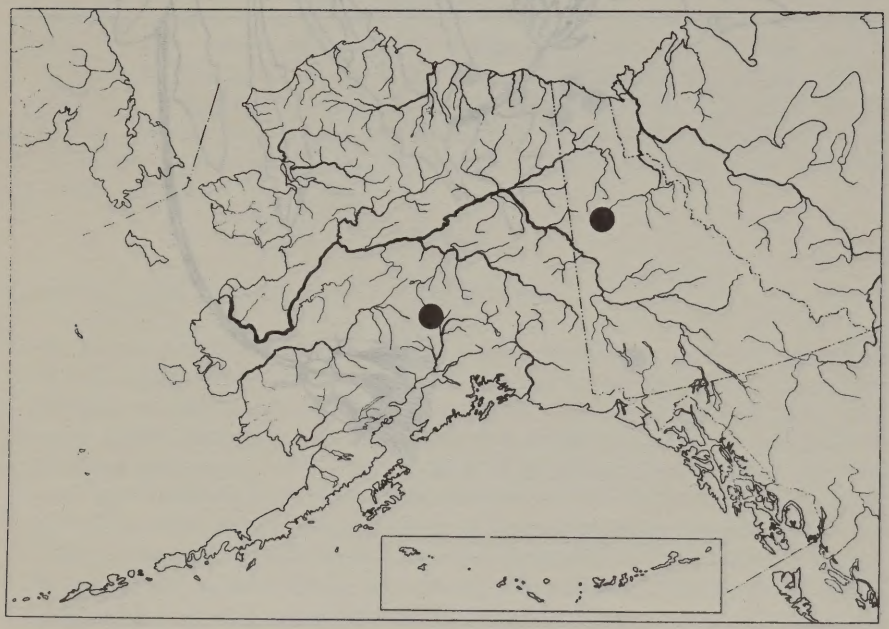
TARAXACUM CARNEOCOLORATUM A. Nelson

This taxon is immediately recognizable as a dandelion, but differs from all others by its deep pink or flesh-colored flowers. Also the lowermost involucral bracts (of each head of flowers) are broadly ovate with pale, even hyaline, margins, and the uppermost bracts are narrow and tapering.

Taraxacum carneocoloratum is known from one locality at Stony Pass in Mount McKinley National Park and from two sites in the Ogilvie Mountains of northwestern Yukon, where it is locally common. It is a plant of alpine slopes and coarse, well-drained substrates.

The question remains as to whether this is a valid species or a minor variant of one. If it is the former, Hultén (1973) has suggested it is the same as the Asian *Taraxacum soczavae,* but more material is required for comparisons.

For the present, threatened status is suggested.



Taraxacum carneocoloratum

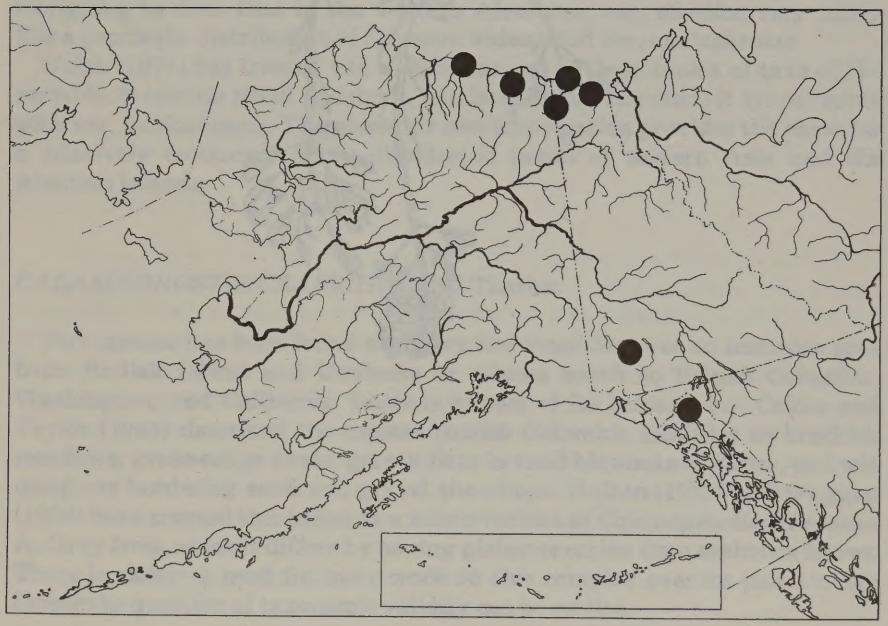
THLASPI ARCTICUM A. E. Porsild

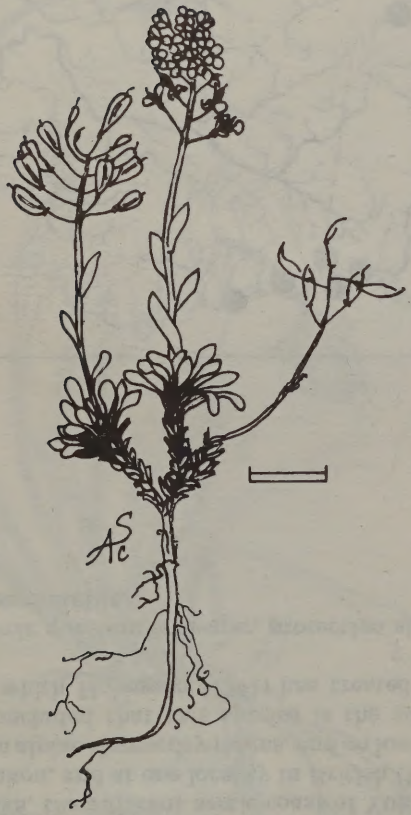
This diminutive white-flowered mustard is distinguished from its close relatives in the family Cruciferae, particularly *Draba, Arabis,* and *Braya,* by its compact rosette of glabrous leaves, its glabrous leafy stem, and short, broad, somewhat club-shaped fruits strongly compressed perpendicular to the septum and spreading on pedicels that are as long as the fruits.

The taxon has never been seen in abundance, but it has been found in northeastern arctic Alaska, the adjacent arctic coast of Yukon, in the mountains of southwestern Yukon, and at one locality in British Columbia. It grows on well-drained sites on alpine slopes, dry ridges, and on low river terraces.

Hultén (1973) concluded that this species is the same as the Asian *T. cohleariforme* DC. which Holmgren (1971) has treated as a synonym of *T. montanum* L.

Until the taxonomic question is clearer, protection should be offered by a proposal for threatened status.





Thlaspi arcticum

PART 3. RARE TAXA WITH UNDETERMINED STATUS

In several instances taxa are known only from type specimens or from one or more collections at the type locality; therefore, these are not well founded. This does not mean they are not valid as named taxa, but only that we cannot yet evaluate their taxonomic or geographic status. Since they are known from only a single locality, they appear to be very rare, and for that reason they are appended to this treatment. Fieldworkers should be especially vigilant in searching for taxa treated in this section. Being aware of these special cases may make it possible eventually for us to find more material or to conclude that the singular occurrence is not an artifact of our ignorance. We may decide that some are not worthy of formal recognition and place them in synonymy under more common taxa, but only after further studies.

ARTEMISIA UNALASKENSIS var. *ALEUTICA* Hultén
Artemisia tilesii var. *aleutica* (Hultén) S. L. Welsh

This taxon differs from var. *unalaskensis* by having long rhizomes and more narrowly lobed leaves that are tomentose to lanate on both surfaces. It appears that Hultén's (1960) understanding of this taxon was based on sterile specimens alone. Clearly more and better material must be obtained. It is intriguing to note that in the western Aleutians, var. *aleutica* very nicely fills a gap in the distribution of the more widespread var. *unalaskensis.*

Welsh (1974) has treated var. *aleutica* as one of the complex of taxa of the variable *Artemisia tilesii* Ledebour, and in so doing, has made it synonymous with var. *unalaskensis.* Therefore, his new combination provides the name for a relatively common, widely distributed taxon of eastern Asia and the Aleutian Islands.

CALAMAGROSTIS CRASSIGLUMIS Thurber

This species has been found at a very few localities over an immense area from Kodiak Island and Unalaska in Alaska south to British Columbia, Washington, and California. Little is known of its habitat, but Calder and Taylor (1968) described the coastal British Columbia localities as brackish meadows, grass-sedge swale, grassy flats in sand blowouts of dunes, and wet meadows bordering sand and gravel shorelines. Hultén (1942) and Scoggan (1978) have treated this taxon as a minor variant of *Calamagrostis inexpansa* A. Gray from which it differs by having glabrous rather than scabrous leaves. There is clearly a need for more work on this complex over its entire range before the question of taxonomic validity can be settled.

CAREX PLECTOCARPA F. J. Hermann

This alpine sedge is known only from the type locality in Montana and in Alaska from a single locality at Mt. Roberts near Juneau. Its closest morphological relative is *Carex eleusinoides* Turczaninow from which it differs by having achenes that occupy only the lower two-thirds of the perigynium rather than filling it and perigynium margins sharp- or wing-margined, which is another condition related to achene size and development. The two taxa are very similar, and some treatments merge the two. *Carex plectocarpa* may simply manifest a response of *C. eleusinoides* to alpine conditions, and research is under way to study this problem further.

CASTILLEJA ANNUA Pennell

This paintbrush is presumably a very restricted endemic which was believed by Pennell (1934) to differ from its allies by being annual, the annual habit being deduced from its weak taproot. As Welsh (1974) has pointed out, it is more likely a biennial or short-lived perennial with affinities to *Castilleja caudata* (Pennell) Rebristaya and *C. raupii* Pennell. It is either a minor variant of one of these more common taxa, or it is a good species, but one that is now known to be common throughout the Interior where it is found on dry, often disturbed, sites—along river bluffs, roadsides, trails. Studies will be started to resolve these questions and to determine its geographic extent.

ERIGERON HULTENII S. A. Spongberg

Erigeron hultenii is based entirely on the type collection from the Campbell Creek valley east of Anchorage. We found no additional material in herbaria nor was any found at the type locality during recent trips to that site (Batten, personal communication, 1979). It was described as transitional between two more common species, *E. peregrinus* (Pursh) Greene and *E. grandiflorus* W. J. Hooker. The former is common at the type locality. More material is required to evaluate both its morphological and ecological characteristics.

JUNCUS SLWOOKOÖRUM S. B. Young

This small rush is known only from the type locality at Boxer Bay on Saint Lawrence Island. Distinctive are its equitant leaves and two-flowered inflorescence. Hultén (1973) has discounted any relationship of this species to *J. fauriensis* Buch. and suggested that it is depauperate *J. alpinus* ssp. *nodulosis* (Wahlenb.) Lindman which is essentially circumboreal, although not known within 400 km of Saint Lawrence Island.

OXYTROPIS ARCTICA var. *BARNEBYANA* S. L. Welsh

This oxytrope differs from *O. arctica* R. Br. by being taller and more erect and by having white to yellow flowers. All specimens are from Kotzebue, with the exception of a single collection from the Sadlerochit River on the eastern Arctic Slope. Further studies of the Kotzebue material are needed to relate that population to those of *O. koyukukensis* A. E. Porsild in the central Brooks Range and to *O. arctica* from throughout the Arctic.

OXYTROPIS GLABERRIMA Hultén

Oxytropis glaberrima is possibly a trivial, glabrous variant of *O. nigrescens* (Welsh 1967), but we cannot resolve the question satisfactorily until more material of it can be discovered. The taxon remains known only from its type specimen collected at 915 m, 11 km northwest of Kurupa Lake on the north slope of the central Brooks Range. It is a caespitose, blue-flowered, glabrous, alpine oxytrope that because it lacks hairs is quite unlike its close morphological relatives. Most likely it will be found in coarse soils of alpine slopes or ridge crests.

POA EYERDAMII Hultén

Poa eyerdamii is known only from one locality at Port Hobron off Kodiak Island and one near Cordova in Prince William Sound. It is similar to the highly variable *Poa pratensis* L., but differs "in its higher growth and few (usually only two) panicle branches in the lowest whorl and minutely scabrous lower sheaths" (Hultén 1942). A careful study of variation with a good series of specimens is needed to evaluate this taxon.

POA LAXIFLORA Buckley

Poa laxiflora is considered rare in Oregon, Washington, and British Columbia. It has also been found in Alaska at only two localities: Cape Fox on the east shore of Revillagigedo Channel and at a hot spring somewhere in the Behm Canal area (Yes Bay or Short Bay?) of southeastern Alaska. It is a lowland species of wooded areas which occurs (in coastal British Columbia) mainly in moist shaded habitats along the upper margins of sea beaches and in open-forested meadows along riverbanks (Calder and Taylor 1968). Since that habitat is not limited, and the places where the species is known are scattered over a large geographic area, I share the view of K. L. Chambers (personal communication, 1979) that the plant has simply been overlooked and new discoveries will be made as soon as people begin to look for it. Until that day, however, it should remain on the list of rare taxa whose status is undetermined.

POA MERRILLIANA A. S. Hitchcock

Poa merrilliana is known only from its type locality near Yakutat. According to Hultén (1942) it is related to *Poa brachyanthera* Hultén (=*P. pseudoabbreviata* Roshev.), but differs in being far more robust; however, he later (1968) treated it as a doubtful species. No further comment can be made without more material.

POA NORBERGII Hultén

Poa norbergii is known only from its type locality at Hoonah on Chichagof Island in southeastern Alaska. It is, according to Hultén (1942), "closely related to *P. lanata* from which it differs in its short and broad pruinose glumes and lemmas, in its large panicle having many spikelets, in its very scabrous panicle-branches and in scantier lanate hairiness on the lower part of the lemma." More material must be obtained for study before its status can be clarified.

PUCCINELLIA TRIFLORA Swallen

This alkali grass of coastal wetlands is not uncommon in the Cook Inlet-Kenai Peninsula region. Unless there are major changes in that ecosystem, the species is not threatened. The major problem, however, is a taxonomic one. The genus *Puccinellia* as presently treated is complicated by many narrowly defined taxa distinguished by characteristics that may not always be valid. A complete reexamination of the genus is required, not only to address *P. triflora*, but also to consider the status of the other taxa that show extremely restricted distributions. In other instances, these apparently rare taxa have been overlooked or even avoided because of the well-known difficulties in applying names.

RHINANTHUS ARCTICUS (Sterneck) Pennell

Rhinanthus arcticus is known only from its type locality at Yakutat. Although he termed it a doubtful species, Hultén (1967, 1968) included it in the flora on the authority of Pennell (in Stair and Pennell 1947). It is similar to *R. minor* ssp. *borealis* (Sterneck) Á. Löve, but according to Pennell the corolla is larger, with the galea more rounded at the apex, the fruiting calyx larger, and the stem leaves oblong-lanceolate and crenate-dentate rather than linear-lanceolate to lanceolate and sharply dentate. A better assessment of variation in the Yakutat population is needed to establish more clearly its relationship with *R. minor* ssp. *borealis*.

SAXIFRAGA ALEUTICA Hultén

Saxifraga aleutica is densely caespitose and forms very compact, low mats such as *Diapensia lapponica* L. does elsewhere. If both taxa were found together, without flowers or fruits, care would be needed to distinguish them.

It is very likely that *Saxifraga aleutica* is actually more widespread than the map in Hultén (1968) indicates. Since it is a plant of high peaks, a serious logistic effort is required to determine its total range. If it cannot be found at additional localities, notwithstanding the remoteness of its habitat, threatened status could be considered.

PART 4. TAXA WITHDRAWN FROM CONSIDERATION

Several taxa placed on lists of threatened or endangered plants in the past are being dropped from consideration because they are sufficiently common or at least so widely distributed that they are not threatened at present. The status of these endemics must be monitored against the time when loss of habitat and consequent reduction of populations could justify formal listing as threatened or endangered.

CERASTIUM ALEUTICUM Hultén

This chickweed is endemic to the Aleutian Islands, but appears to be well distributed on mountain slopes throughout the Chain. Consequently, it does not now require special protection.

DRABA RUAXES Payson & St. John
Draba ventosa var. *ruaxes* (Payson & St. John) A. S. Hitchcock

This yellow draba is found on calcareous alpine screes in a long mountain arc from central Alaska south through southwestern Yukon, in southern British Columbia, and northern Washington. It does not now qualify as truly rare nor is its habitat so precarious that threatened status is justified.

GENTIANELLA PROPINQUA ssp. *ALEUTICA* (Cham. & Schlect.) J. M. Gillett
Gentiana aleutica Cham. & Schlect.

This small blue gentian is found throughout the Aleutian Islands, on Kodiak and Afognak islands, and on the southeastern Alaska mainland at Juneau. Being widespread in remote areas, it does not now qualify as a threatened taxon. Furthermore, given that distribution, if carefully sought, it is very likely to be found elsewhere in the region.

GYMNOCARPIUM HETEROSPORUM W. H. Wagner

This apomictic species of hybrid origin is intermediate between two more familiar ferns, *G. dryopteris* (L.) Newman and *G. robertianum* (Hoffman) Newman (Wagner 1966). It has been found in wooded areas with exposed bedrock, its habitat being shaded moist calcareous cliffs, crevices, and screes. The distribution map in Wagner (1966) shows five widely separate localities in Alaska spread over a large area. It is reasonable to conclude, particularly since ripe spores are required for determination of species, that this taxon has been overlooked and can be found throughout the forested regions of the state.

LESQUERELLA ARCTICA var. *SCAMMANAE* R. C. Rollins

This taxon has been known only from its type locality. It was thought to differ from var. *arctica* in the larger size of all parts of the plant. A recent reevalution (Batten et al. in press) with more abundant material at hand has shown that the features attributed to var. *scammanae* can be found throughout the range of var. *arctica,* therefore it is not a valid taxon and can be reduced to synonymy under *L. arctica.*

RANUNCULUS OCCIDENTALIS ssp. *NELSONII* (DC.) Hultén

This taxon differs from its close morphological relatives, ssp. *occidentalis* Nuttall and ssp. *insularis* Hultén by its coarse, tall stem at maturity and dense brown hairs of stems and petioles. It is found throughout the Aleutian Island chain where it is apparently not uncommon; therefore, threatened status is unnecessary.

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APPENDIX

Systematic list and summary of status for all taxa treated in the manual: E=endangered, T=threatened, U=status undetermined, W=withdrawn from consideration

Aspidiaceae—Shield Fern	
Gymnocarpium heterosporum	W
Polystichum aleuticum	E
Poaceae (Gramineae)—Grass	
Calamagrostis crassiglumis	U
Poa eyerdamii	U
Poa laxiflora	U
Poa merrilliana	U
Poa norbergii	U
Puccinellia triflora	U
Cyperaceae—Sedge	
Carex jacobi-peteri	T
Carex plectocarpa	U
Juncaceae—Rush	
Juncus slwookoorum	U
Salicaceae—Willow	
Salix ovalifolia var. *glacialis*	E
Polygonaceae—Buckwheat	
Eriogonum flavum var. *aquilinum*	E
Portulacaceae—Purslane	
Montia bostockii (Claytonia bostockii)	T
Caryophyllaceae—Pink	
Cerastium aleuticum	W
Ranunculaceae—Buttercup	
Ranunculus occidentalis ssp. *nelsonii*	W
Papaveraceae—Poppy	
Papaver alboroseum	T
Papaver walpolei	T
Brassicaceae (Cruciferae)—Mustard	
Draba ruaxes (Draba ventosa var. *ruaxes)*	W
Erysimum asperum var. *angustatum*	T

Lesquerella arctica var. *scammanae*	W
Smelowskia borealis var. *villosa*	T
Smelowskia pyriformis	E
Thlaspi arcticum	T
Saxifragaceae—Saxifrage	
Saxifraga aleutica	U
Fabaceae (Leguminosae)—Pea	
Oxytropis arctica var. *barnebyana*	U
Oxytropis glaberrima	U
Oxytropis kobukensis	E
Oxytropis kokrinensis	T
Apiaceae (Umbelliferae)—Parsley	
Podistera yukonensis	T
Gentianiaceae—Gentian	
Gentianella propinqua ssp. *aleutica (Gentiana aleutica)*	W
Boraginaceae—Borage	
Cryptantha shackletteana	E
Mertensia drummondii (Mertensia lanceolata var. *drummondii)*	E
Scrophulariaceae—Figwort	
Castilleja annua	U
Rhinanthus arcticus	U
Asteraceae (Compositae)—Sunflower	
Artemisia aleutica	E
Artemisia senjavinensis	T
Artemisia unalaskensis var. *aleutica*	U
Aster yukonensis	T
Erigeron hultenii	U
Erigeron muirii (Erigeron grandiflorus ssp. *muirii)*	T
Taraxacum carneocoloratum	T

GLOSSARY

Achene—Small, dry, indehiscent one-seeded fruit.
Beak—Narrow prolongation of the summit of a perigynium.
Bract—Reduced leaf.
Caespitose—Growing in tufts or dense clumps.
Calyx, calyces (Pl.)—Outer whorl of floral parts, i.e. the sepals
Capitate—Aggregated into a compact cluster.
Caudex—Stem, referring here particularly to the basal portions at ground level.
Ciliate—Bearing hairs along the margins.
Clasping-auriculate—Condition in which projections at the base of certain leaves partially surround the stem.
Corolla—Second (inner) whorl of floral parts, i.e. the petals.
Crenate—Shallowly round-toothed.
Culm—Stem of grasses and sedges.
Decumbent—Lying down on the ground, but with the summit ascending, erect.
Dentate—With sharp coarse teeth perpendicular to the margin.
Distigmatic—Having two stigmas as in *Carex*, in which either two or three (tristigmatic) stigmas can be characteristic.
Entire—Margin continuous without indentations of any kind.
Equitant—Overlapping in two ranks as in the leaves of *Iris*.
Galea—Used here to refer to the helmet-shaped upper lip of the bilabiate corolla in *Rhinanthus*.
Glabrous—Without hairs.
Glandular—Having secreting organs or glands which can be stalked (on the summits of hairs) or sessile.
Glaucescent—Slightly glaucous, sea-green.
Glaucous—Covered with a whitish or waxy substance.
Globose—Nearly spherical.
Glume—One of two sterile bracts at the base of a grass spikelet.
Hyaline—Translucent, even transparent.
Hypogynous—Flower with parts (sepals, petals, stamens) inserted below the pistil.
Indusium, indusia (pl.)—An elaboration of the fern frond surface that covers or contains the sporangia (sori).
Inflorescence—Used in the sense of a flower cluster as well as the specific arrangement of flowers.
Involucre, involucrum—One or more whorls of small leaves or bracts (phyllaries in the Compositae) close beneath a flower or flower cluster.
Lanate—Woolly with long, intertwined, curly hairs.
Lanceolate—Lance-shaped, that is longer than broad, widening above the base, but below the middle, and tapering to the apex.
Lemma—The lower one of the pair of bracts that encloses a grass flower.

Ligulate—Tongue-shaped, referring here to the series of ray flowers in the composite head with long extensions of the corolla.
Linear—Long and narrow, the sides parallel or nearly so.
Oblanceolate—The reverse of lanceolate in that the structure is broader at the distal third than at the middle and tapers towards the base.
Obovate—Reverse of ovate, the terminal half broader than the basal.
Panicle—Used here in reference to the inflorescence of certain grasses.
Pedicel—Stalk of one flower in a cluster.
Peduncle—Stalk of a flower cluster or of a solitary flower when it is the inflorescence.
Perigynium, perigynia (pl.)—Saclike, membranaceous structure that surrounds the pistillate flower in *Carex*.
Petiolate—Having a petiole or leaf stalk.
Pinnate—The leaflets of a compound leaf placed on either side of the rachis (the axis bearing the leaflets).
Pinnately lobed—Lobes, long and having the appearance of a pinnate leaf.
Pistil—Unit of stigma, style, and ovary.
Prostrate—Lying flat on the ground.
Pruinose—Having a white bloom on the surface.
Pubescent—Covered with short, soft hairs.
Pustulate—Having raised areas like blisters.
Rhizome—Underground stem.
Rosette—Arrangements of leaves in a cluster from a crown or center.
Scabrous—Rough to the touch.
Serrulate—Having minute teeth.
Sessile—Not stalked.
Setose—Covered with bristles.
Spike—An unbranched inflorescence in which the flowers are sessile; in *Carex* the spikes of flowers are compact or congested.
Tomentose—With matted, soft wool-like hairs.
Trichome—Hair or bristle, used here for *Smelowskia borealis* var. *villosa* to indicate stout, thick hairs.
Tuberculate—Having wartlike thickenings, knobby projections.
Umbel, umbellate—Flat-topped inflorescence in which pedicels and peduncles arise from a common point.
Umbelliform—Resembling an umbel.
Villous—Having long, soft, shaggy hairs, not matted.

INDEX

Artemisia aleutica 1
Artemisia senjavinensis 19
Artemisia unalaskensis var. *aleutica* 47
Aster yukonensis 21
Calamagrostis crassiglumis 47
Carex jacobi-peteri 23
Carex plectocarpa 48
Castilleja annua 48
Cerastium aleuticum 52
Cryptantha shackletteana 3
Draba ruaxes 52
Erigeron hultenii 48
Erigeron muirii 25
Eriogonum flavum var. *aquilinum* 6
Erysimum asperum var. *angustatum* 28
Gentianella propinqua ssp. *aleutica* 52
Gymnocarpium heterosporum 52
Juncus slwookoorum 48
Lesquerella arctica var. *scammanae* 53
Mertensia drummondii 8
Montia bostockii 31
Oxytropis arctica var. *barnebyana* 49
Oxytropis glaberrima 49
Oxytropis kobukensis 10
Oxytropis kokrinensis 33
Papaver alboroseum 35
Papaver walpolei 37
Poa eyerdamii 49
Poa laxiflora 49
Poa merrilliana 50
Poa norbergii 50
Podistera yukonensis 39
Polystichum aleuticum 12
Puccinellia triflora 50
Ranunculus occidentalis ssp. *nelsonii* 53
Rhinanthus arcticus 50
Salix ovalifolia var. *glacialis* 14
Saxifraga aleutica 51
Smelowskia borealis var. *villosa* 41
Smelowskia pyriformis 17
Taraxacum carneocoloratum 43
Thlaspi arcticum 45

NOTES

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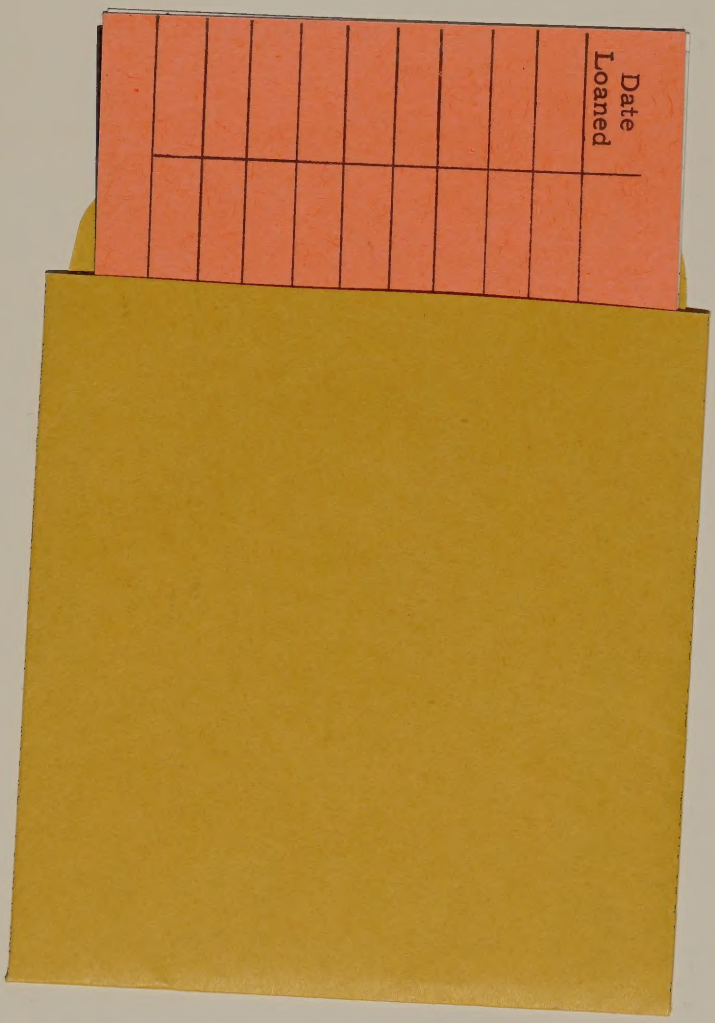

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